

AUTOMOTIVE INDUSTRIES

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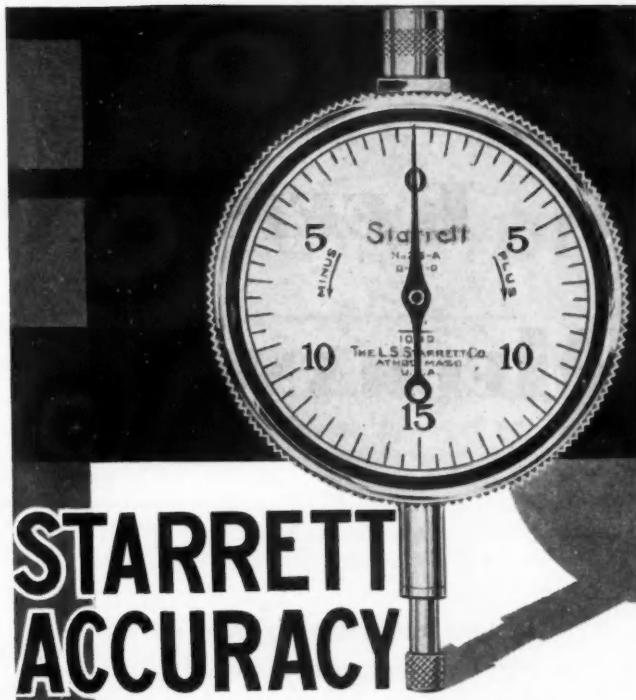
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Automotive Industries



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April 6, 1935

KEEPING PACE WITH MECHANICAL DEVELOPMENT

IF ASKED to name the most outstanding Ford improvements of the last few years, most laymen would answer: "The Ford V-8 engine and riding comfort."

Yet of equal interest to engineers are many non-mechanical developments—the result of constant, simultaneous research into every item that goes into building Ford cars and trucks.

One of these is the new enamel finish. It not only has greater adherence and gives better protection to the metal but is unaffected by strong solvents such as radiator alcohol.

In one locality it was found that salesmen were pouring gasoline on the hood, and igniting it. When the fire burned out they wiped off the spot to show that no harm was done. The Ford Motor Company immediately took steps to stop this practice,

which, however unwise or dangerous, indicates the quality of the enamel.

Ford enamel is interesting technically. Its synthetic base, alkyd or gyptal resin, is made from materials which are not resin-like in character. One is glycerine; the other is phthalic acid, a coal tar product. Resin made from this combination has extreme durability and because of this, soy bean oil can now be used to manufacture a superior enamel. Plastics from the remainder of the soy bean are used for making such Ford parts as shift-lever knobs, distributor caps and light switches.

This enamel has a long-lasting luster, is much easier to keep clean and does not wear away with polishing. It is but one example of the way in which all other details of Ford cars and trucks are keeping pace with mechanical development.

F O R D M O T O R C O M P A N Y



Schedule 440,000 For April

Confidence Grows That Spring Sales Will Support Production

by Harold E. Gronseth

Detroit News Editor, Automotive Industries

Entering the second quarter with production activity still rising, the motor industry is likely again to cross the million mark in output during this period. Confidence is growing that a heavy spring demand will support a production rate virtually equal to that of the first quarter when in the neighborhood of 1,087,000 cars and trucks were turned out. If their April plans materialize the motor companies will produce upwards of 440,000 cars and trucks this month, or 18 to 20 per cent more than were turned out in April last year, when output totaled 373,108 units. It will be the heaviest output since May, 1930.

Probabilities are that April will be the peak production month this year although no one expects that the top in sales will be reached this month. Spring sales drives are just getting under way in earnest but even without the benefit of their stimulus retail sales already have shown favorable response to improving weather conditions.

The heavy production rate of the industry is building up field stocks, but as yet there is no indication of over-crowding dealers. Some dealer organizations will continue to experience a shortage for some time to come, while others are adequately supplied.

The used car situation is not yet alarming, but has reached the point
(Turn to page 468, please)

Welch Succeeds Childs in Commerce Department

Howard S. Welch, of South Bend, for many years connected with the export and domestic fields of the automotive industry, has been appointed chief of the Automotive-Aeronautics Trade Division of the Bureau of Foreign and Domestic Commerce, Claudius T. Murchison, director, has announced.

Automotive Industries

The new division chief succeeds Archie W. Childs, who has been transferred to the Foreign Service of the Bureau and assigned to Rio de Janeiro, Brazil.

Mr. Childs in his transfer to the Foreign Service reenters a field familiar to him. A native of Ohio, he served for over six years as Vice-Consul in Brazil, Portugal and elsewhere. After leaving the Consular service in 1925, he was employed in an executive capacity in the automotive industry until 1928 when he entered the Bureau as assistant chief of the Automotive-Aeronautics Trade Division, later being promoted to chief.

Car Makers Confident Labor Situation is Favorable; Prepare for Rubber Strike

With motor production at high tide the industry so far has escaped any interruption to operations due to labor troubles. What fears of a general strike existed are subsiding, despite the apparently critical situation facing the tire manufacturers in Akron. The possibility of sporadic outbreaks at individual plants is recognized, but motor men are growing more confident that the spring peak in production, the target of labor agitators, will come and go without any serious interruptions.

Alert to developments in the rubber industry, automobile manufacturers have been taking steps to protect themselves in the event a strike materializes in Akron. Normally tire shipments to automobile

Plymouth Introduces New Convertible Coupe at \$695

Plymouth announced on Thursday new convertible coupe priced \$695 at Detroit to be in production soon. An outstanding feature is a new body construction embodying sub frame built in body and fastening to main chassis frame. The double frame design is said to give the convertible body the same strength and rigidity as the sedan. Plymouth considers this a big development in body design. This model will be carried as a deluxe model trimmed in hand buffed leather. Other specifications are the same as the regular Plymouth line.

Steel Prices Reduced On Cold Finished Bars

According to filings with the American Iron and Steel Institute, the price of cold finished carbon steel bars was reduced \$3 a ton at Pittsburgh, Gary, Chicago and Buffalo, effective April 11. This brings prices at these basing points to correspond with Cleveland where the \$3 a ton cut went into effect April 1.

plants are pretty much on a hand to mouth basis, with inventories averaging only four to five days' supply. But with a strike of rubber workers looming, purchases were increased and current tire inventories at motor plants now range from two to three weeks' supply with heavy shipments continuing. Determined to continue operations even though a strike is called, the tire manufacturers have prepared for the worst, erecting barbed wire entanglements about their plants and adding to their plant police forces. The strike vote conducted by the AFL is still in progress at Akron tire plants, but some idea of the attitude of workers may be had from the poll conducted by the works council at the Good-year plant where over 90 per cent voted, most of whom opposed a strike.

(Turn to page 469)

April 6, 1935

New SAE Specifications Cover Broader Range of Steels and Include Castings

A rather extensive revision of its specifications has been made by the Iron and Steel Division of the S. A. E. Standards Committee, as previously reported in these columns, and the new specifications appear in the S. A. E. Handbook for 1935. When this work of revision was started in April, 1934, consideration had to be given to the new conditions brought about by the adoption of the Steel Code, and this made necessary the calling in of a considerable number of steel users not represented on the Division. Whenever it was proposed to adopt composition limits which were not recognized by the Code at the time, the question was referred to the steel company representatives on the Division who were participating in a further development of the Steel Code, which helped to settle matters harmoniously.

As now revised, the specifications cover carbon steels with carbon contents ranging from 0.05 to 1.05 per cent, with sufficient range in manganese and sulphur contents to meet practically all requirements. All compositions standardized conform to the Steel Code, and it is therefore not necessary to pay extra for any of the steels.

Many additions have been made to the grades of alloy steel standardized, which now include heat-resisting and corrosion-resisting alloys. As illustrating the great range of compositions now covered by the 109 standard specifications, it is pointed out that they make available steels whose tensile strengths vary all the way from 45,000 lb. per sq. in. for a plain carbon steel to 250,000 lb. and over, and that any intermediate value can be met by at least two specifications. Excellent alloy steels are said to be available now for the heaviest of automotive sections.

The grain size chart developed by the American Society for Testing Materials has been adopted by the S. A. E. and is included in the new steel specifications.

Another new feature is a group of specifications of gray-iron castings. These pertain solely to automotive castings and are intended to supplement gray-iron specifications issued by the A. S. T. M. and the American Foundrymen's Association.

The latest approved specifications for heat-treated steel castings, carbon and alloy, of the A. S. T. M. have been adopted as standard by the S. A. E. Similarly, the A. S. T. M. standard specification A-47-33, covering malleable castings, was found to be acceptable for automotive use and was therefore adopted.

Buick Field Staff Meets

The Buick field staff, including regional and zone managers and distributors from all sections of the country, attended a general sales meeting at the Flint plant last week. Harlow H. Curtice, president, out-

lined the second quarter's manufacturing program. Other speakers were Thomas H. Corpe, director of advertising and sales promotion, and A. C. Sellgren, director of organization and analysis.

Reo Gets \$1,500,000 U. S. Job; Largest in History

Government contracts for speedwagons and truck equipment amounting to \$1,500,000 have been awarded to the Reo Motor Car Co. Donald E. Bates, president, has announced. This total includes the \$300,000 U. S. contract reported last week in *Automotive Industries*.

Production on thousands of trucks for the Department of the Interior and the Department of Agriculture was started as soon as contracts were signed. The order is the largest in Reo's history.

Most of the jobs will be equipped with dump and stake bodies. Delivery will start immediately.

In commenting on the order, Mr. Bates pointed out that Reo's general commercial car business is already running far ahead of 1934 and predicted 1934 would be the best year since 1929.

U. S. to Test Plane Powered With Automobile Engine

Efforts of the Bureau of Air Commerce to stimulate private flying through the development of low-priced planes took a new turn this week when it was announced that the Bureau had placed an experimental order for an airplane powered with a well-known automobile engine.

According to John H. Geisse, chief of the Development Section of the Bureau, the order has been placed with the Fahlin Manufacturing Co., of Marshall, Mo., for

a two-place, side by side, inclosed cabin monoplane.

"Aircraft engines of 90 horsepower cost in the neighborhood of \$1,000, due to the small quantity produced," Mr. Geisse said. "An automobile engine of the same power can be purchased for less than \$150, about the cost of overhauling the aircraft engine. In addition to the reduction in first cost, the automobile engine offers the attractive features of a much lower maintenance and replacement cost and servicing facilities in practically every community."

"The performance of the airplane with the automobile power plant is expected to be comparable to that of airplanes with aircraft engines except that the useful load must be less to compensate for the additional automobile engine weight," Mr. Geisse said. "However, the weight of this power plant will be no greater than that of the old OX5 engines which were the backbone of civilian flying after the world war and which were so extensively used in training planes during the war. The reliability should be greater."

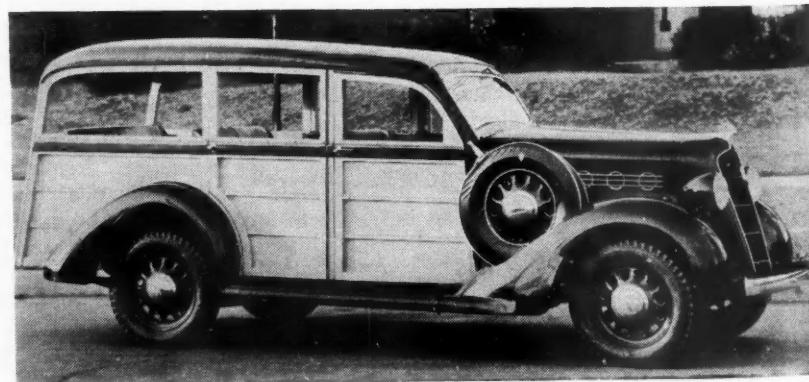
Ford Aids Used Car Sales With Papers, Posters, Radio

To stimulate the demand for used cars which are coming into dealer hands in substantial numbers due to the current high rate of Ford new car sales, the Ford Motor Co. has designed a comprehensive three-way advertising campaign on used cars for its dealers. The campaign includes newspaper, radio and poster advertising.

The use of the program is optional with branch officials and the dealers in each branch territory. However, advertising already has appeared in a number of branch territories.

Stock Values Decline

The aggregate market value of seven leading automotive stocks traded in on the New York Stock Exchange showed a 5.2 per cent decrease at the close of business March 30 from the aggregate value at the close of business Feb. 28, according to Frazier Jelke & Co., New York.



Plymouth's new "Westchester" model station wagon achieves a distinctive appearance through the use of the sedan-roof design and streamline back. The car seats eight persons and can be converted into a light truck by removing the tonneau seats.

AMA Starts Anti-Wagner Bill Campaign

A campaign against the Wagner Labor Relations Bill will be instituted immediately by the Automobile Manufacturers Association, Alfred Reeves, vice-president of that organization, announced this week. Details of the campaign have not been revealed but it is understood that it is planned, among other things, to enlist the cooperation of the industry's trade organizations on a comprehensive scale.

In announcing the campaign, the AMA said that it "stands squarely on the American principle that men have an inalienable right to work free from any coercion from any source whatsoever."

"It supports, therefore, the principles laid down for the industry by the President in his settlement of March 25, 1934, in which he stated among other terms:

1. "The employers agree to bargain collectively with the freely chosen representatives of groups and not to discriminate in any way against any employee on the ground of his union labor affiliations.

2. "If there be more than one group each bargaining committee shall have total membership pro rata to the number of men each member represents.

3. "The government makes it clear that it favors no particular union or particular form of employee organization or representation. The government's only duty is to secure absolute and uninfluenced freedom of choice without coercion, restraint or intimidation from any source.

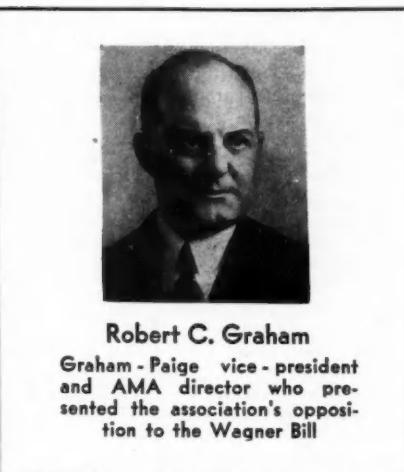
"Believing that the President's statement sets down fair and equitable rules for the government of labor, the Automobile Manufacturers Association and its members ask that fair minded men support the President and the true cause of labor by urging Congress not to pass any legislation which violates any of these principles.

"Equally it follows that we are opposed in principle to any and all legislation the effect of which would be to impose on American industry and the American worker the domination of the professional labor organizer of which the American Federation of Labor is the present outstanding example. As an instance of such proposed legislation the Wagner Bill is cited."

Hearings on the Wagner Bill were concluded on Tuesday of this week by the Senate Committee on Education and Labor. According to James A. Emery, counsel for the National Association of Manufacturers, who was the closing witness for the opposition, the hearing developed the greatest array of opposition ever expressed by industry in connection with proposed legislation. Incidentally the bill is said not to be on the administration's "must" list for enactment at this session, despite rumors to the contrary.

Motives of American Federation of Labor leaders in sponsoring the Wagner Labor Disputes Bill were questioned last Friday when a delegation of the most prominent figures in the motor industry appeared to oppose passage of the measure.

The attack on the bill was made by Robert C. Graham, vice-president of the Graham-Paige Motors Corp., and a director of the Automobile Manufacturers Association. Leaders of the industry who supported his views by their presence included:



Robert C. Graham

Graham - Paige vice - president and AMA director who presented the association's opposition to the Wagner Bill

Terming the Wagner measure "class legislation of the worst kind," Mr. Graham pointed out that it sets forth in detail what are called "unfair labor practices" for an employer, but "by its very silence" encourages labor organizations to indulge in unfair labor practices.

"It is clearly the purpose of the bill to vest labor organizations with greater powers," the Senate Committee was told. "Instead of furthering the interests of American labor as a whole, this bill, whatever its declared purpose appears to be, really is in the interest of a small minority represented by labor leaders who apparently seek legislative sanction of their efforts to dominate all American labor.

"We believe that any bill which purports to prevent unfair labor practices on the part of employers should, likewise prohibit unfair labor practices on the part of labor organizations which often take forms not amenable to existing criminal or other legal control," Mr. Graham continued.

Mr. Graham reminded the Committee of the role being performed by the automobile industry in promoting general business recovery and emphasized the fact that passage of the bill would seriously impair the industry's ability to continue to exert its constructive influence in this direction.

The bill was viewed as menacing the peaceful relations between employers and employees established by President Roosevelt in his settlement of a year ago.

"Under the terms of this settlement, all employees in the industry have been accorded the right of collective bargaining, of freely choosing representatives, of protection against discrimination and of redress of grievances under Section 7a," Mr. Graham explained. "We do not believe that it is the intention of Congress to repudiate the American principles of fair play embodied in the President's settlement, or to subject the industry to the agitation and struggle for political and economic power on the part of labor organizers among automobile workers which would follow the enactment of this bill into law."

If labor organizations are to receive greater powers, Mr. Graham considered it essential that they "be compelled by law" to change their structure from the existing loosely-organized, voluntary associations to duly incorporated organizations which, together with their directors, officers, agents and members, would be answerable in law

(Turn to page 470, please)

In last week's issue of *Automotive Industries* it was recorded that Carl J. Snyder, of the Chrysler Corporation, won a \$50 prize in a missing word contest conducted by the Bundy Tubing Company. A check for the prize money was sent to Mr. Snyder in a section of Bundy Tubing incorporated in the trophy shown.



Federal Introduces Anniversary Models

A new series of its Models 15, 18, 20 and 25 (Silver Anniversary models) has been announced by the Federal Motor Truck Co. They differ from their predecessors mainly in having more modern styling and in having the powerplant located further forward. This latter change resulted in reducing the turning radius and the overall length, and in a more nearly equal division of the load between front and rear wheels. In addition, the gross load ratings have been increased over those of corresponding earlier models. Prices remain unchanged.

Two designs of cab are being offered for these trucks, the standard cab having a one-piece sloping windshield and the "deluxe" cab a V-type sloping windshield and an insulated steel roof lined with plywood. Both cabs are 2 in. longer than those of preceding models, and the seats are lower for greater comfort.

The standard wheelbase of all models is 136 in., the same as previously, but each of the optional wheelbase lengths has been decreased 6 in. Gross-load ratings have been increased as follows: Model 15, from 10,000 to 11,000 lb.; Model 18, from 11,000 to 12,000 lb.; Model 20, from 12,000 to 13,000 lb. and Model 25, from 14,000 to 14,500 lb.

A change made in the six-cylinder Hercules engines with which these trucks are powered is that the exhaust is now carried down at the rear instead of at the center, which affords greater accessibility for adjustments.

Federal Motor Truck Co.

Federal Motor Truck Co. reports for 1934 a net profit of \$50,449, which compares with a net loss of \$165,062 in the preceding year.

	1934	1933
Current assets (Inc. \$675,082 cash and U. S. Securities)	\$2,526,942	\$2,452,489
Current liabilities	340,195	238,298
Working capital	2,186,747	2,214,191

Schedule 440,000 for April

(Continued from page 465)

where manufacturers are determined to do something about it and are mapping out special advertising and sales programs intended to relieve dealers—some of whom are getting nervous—of the burden of tying up too much capital.

Estimates of dealer inventories of used cars range from 350,000 to 425,000. But with expanding sales, such stocks are not considered dangerous. The manufacturers desire only to be forehanded in taking steps to avoid what might soon become a serious problem. In the boom years used car stocks ranged from 600,000 to 700,000. The situation this year differs in another important respect, in that dealers now are able to finance up to 60 per cent of their used car inventories, whereas a few years ago they could not borrow on used cars.

One sales manager returning from a tour of the South and West said that out of more than 100 dealers visited only two had the used car situation out of control and that was because of poor management.

March production of Ford V-8 cars and trucks in the United States totaled 158,887 units, compared with 77,947 in March, 1934. Domestic production of 386,326 units in the first quarter, compared with 194,859 in the first quarter of last year, an increase of 98 per cent. Ford Motor Co. of Canada, Ltd., produced 10,613 cars and trucks in March, against 6,121 a year ago while first quarter production of 24,607 units, compared with 18,719 for the same period last year.

Production of Graham cars for the first quarter this year was the highest in four years and nearly double that of last year. March output of 3391 cars brought the first quarter's total to 9089, compared with 5804 for corresponding period last year and 6881 in 1931. March production last year was 3002 cars and in March, 1931, was 2054.

Reo Motor Car Co. built and shipped during the first quarter 50.3 per cent more cars and trucks than during the same period last year.

March production of Pontiac cars totaled 17,802, against 14,820 in March last year. First quarter output totaled 51,809 cars, against 33,701 in the corresponding 1934 period. Around 19,000 cars are scheduled for April.

For the second consecutive week retail deliveries of Chrysler-made passenger cars and trucks set a new all time record during week ended March 30 when sales totaled

17,689 units, an increase of 12.7 per cent over the 15,696 units sold during the preceding week which also was a record week. The new mark was 31.7 per cent above the corresponding week last year.

Plymouth, as usual, accounted for the major share of the corporation's total with deliveries rising to a new high of 9728 units, compared with 9296 during last week of June, 1934, the previous record week. Deliveries of Chrysler cars totaled 1135, an increase of 12.6 per cent over the preceding week and 592 per cent over the corresponding week of 1934. It was the biggest week since the one ended August 1, 1931. Deliveries of Dodge cars and trucks during week of March 30 totaled 6190, which compares with 5492 in the preceding week.

All Oldsmobile production records were broken in March when 18,432 cars were built, an increase of 21.5 per cent over the alltime record set last month. Employment has kept pace with production and on March 29 5950 persons were on the payrolls of the Olds plant, a new all time high.

Retail deliveries of Ford V-8 cars and trucks in March totaled 126,783 units, the largest month sales volume since June, 1930, it was announced by the Ford Motor Co. The March total was more than double the volume of retail deliveries in March, 1934, when the total was 61,553 units.

Retail deliveries for the first quarter totaled 293,319 units, or 116 per cent more than the 135,634 units delivered in the first quarter of 1933. The first quarter total was 33 per cent greater than the combined totals for the first quarter in 1932, 1933, 1934.

Hupp Temporary Restraining Order Issued by U. S. Court at Detroit

A temporary restraining order enjoining Arohie M. Andrews, Hupp chairman, and other members of the Hupp board from effecting certain stock option, salary and commission contracts was granted Saturday, March 30, by Judge Edward J. Moinet, sitting in the U. S. District Court at Detroit. Judge Moinet set Tuesday, April 9, for a hearing on the case.

The order was sought by J. Walter Drake, one time Hupp chairman and former assistant Secretary of Commerce in the Hoover cabinet. Mr. Drake was represented by Hal H. Smith. Mr. Andrews did not appear in court but was represented by George L. Schein, Hupp counsel, who stated Mr. Andrews has just returned from Bermuda and had had no opportunity to prepare an answer to the bill of complaint.

In his petition for the restraining order Mr. Drake objected to contracts between the corporation, Mr. Andrews, Frederick Cardway, a director, the Automobile Ownership Survey, and the Seminole Paper Co. Mr. Schein agreed to the restraining order applying to the first three, but objected to the order applying to the contract with the paper company. His objection was based upon the fact that a third party is involved and damages might be asked.

Mr. Drake's petition alleges that a con-

tract is pending between Mr. Andrews and the Hupp corporation under which the board chairman would be given an option to purchase 100,000 shares of Hupp stock, would receive a monthly salary of \$1500 and a \$10 commission on every car sold above an established minimum. The contract with Mr. Cardway, it is charged in Mr. Drake's petition, provides for a commission on foreign sales.

It is further alleged in the petition that Mr. Andrews is the reputed owner of the Automobile Ownership Survey, a sales system which obtains names of prospective car buyers in exchange for cigarette lighters and that Hupp dealers are required to pay the Ownership Survey \$65 for each name of a car purchaser submitted by the organization. The contract with the Seminole Paper Company, it is alleged, covers a deal whereby Hupp supplies cars for a contest conducted by the paper concern. Mr. Drake further charges that because of the management of the corporation the dealer organization has been demoralized and that the corporation's suppliers have been forced to sell to the company on a C.O.D. basis, although there is no question of the company's solvency and in Mr. Drake's opinion no receivership action is necessary.

Last Monday the New York Stock Exchange invited the Hupp directors to appear before the Listing Committee for a hearing on the question of suspending Hupp

stock from trading and making application to the Federal Securities and Exchange Commission to have the stock stricken from the list. The invitation was issued in a telegram which stated that the stock list committee was concerned over "apparent disregard by directors of Hupp Motor Car Corp. of agreements entered into with this committee by individuals believed to speak for the company, and in some cases by disregard of agreements reported to it to have been confirmed by formal action of directors."

When officials and office employees came to work Monday morning they found a notice on the door of the main entrance notifying them of their dismissal from the service of the company. Approximately 300 employees were affected by the lockout. Later reports indicate the majority of employees dismissed Monday have been rehired.

Chicago Hupmobile dealers have formed an association to represent a selling organization throughout the country to support Mr. Drake in his fight against the present management.

According to press reports Hupmobile is said to have asked the Federal Reserve Bank for a loan of \$2,000,000 to strengthen its working capital position. The need for additional funds was indicated in a letter to the Stock Exchange committee pointing out that drastic action would prejudice an extension of credit now under consideration by suppliers. In Detroit A. M. Andrews is reported to have said that the company had \$450,000 in cash and \$1,000,000 in live inventories, but would like to have more cash during the heavy production season.

Car Makers Confident Labor Situation is Favorable

(Continued from page 465)

While all is serene in the Detroit labor situation, attention has been directed to the possibility of a federation being formed of the bargaining agencies set up by the ALB. Some observers see in the recent formation of the "Officers Association of Automobile Industry Employees," the forerunner of a big union of automobile workers. Although alive to its possibilities, close observers are not inclined to view this move as a threat to labor relations in the industry. To begin with the association was formed only as a club for mutual education, the exchange of ideas and experiences and possibly to cooperate in supporting labor legislation. It may never get beyond this stage. At least there is no movement on foot now to weld the bargaining agencies at the various plants into a cohesive organization.

The Labor Board is now working on rules of procedure for the conduct of the bargaining board, a task expected to be completed within a week. Up to the present time 60 boards have been set up at various plants, 30 of which are in Michigan, 16 being in Detroit. Until such time as uniform rules of procedure could be drawn up by the ALB, the conduct of the bargaining agencies was left to be agreed on by the managements and the boards at the various plants.

Labor Clauses Stronger; 7a Unchanged in New Administration NRA Measure

Casting aside pretenses that Congress would be left to write its own NRA bill Administration leaders this week rushed to the Senate a proposed measure for extending the life of NRA drawn along lines originally recommended by President Roosevelt.

Significant in the proposed Administration measure is the fact that the controversial Section 7a has not been changed from its form in the original Recovery Act which expires June 16 and for which a two year extension is sought.

The principal changes in the bill are those which would confine general industrial codes to those industries operating in, or affecting, interstate commerce with provisions for wages-and-hours codes for other industries, a strengthening of the labor section by empowering employees to take civil action against employers to recover losses suffered by violation of this section.

Broad powers are granted the President under the bill's terms. He may set up whatever agencies he deems necessary. The provision for the formulation of codes in the revised version is practically the same as in the original Act, but the language appears to make them more voluntary on the part of industry. The President is empowered to impose codes upon industries when there is direct evidence of excessive

hours and inadequate wages in those industries, and then the codes would be limited to wage and hour provisions and child labor prohibition.

In the matter of enforcement the measure provides that all courts subject to the jurisdiction of the United States shall be invested with jurisdiction to "prevent and restrain violations of any code or agreement approved or prescribed." District Attorneys are empowered to institute proceedings in equity in their respective districts under direction of the Attorney General to prevent and restrain any violation of any code or agreement to which the President is a Party. Upon request of the President the Federal Trade Commission may make any investigation considered necessary to enable the President to carry out the provisions of the bill.

All codes are extended for a period of 90 days beyond June 15 unless previously reviewed by the President. However, no code shall continue in effect beyond the 90 day period unless the President has reviewed such code and has approved it.

The President also is authorized to establish such agencies as he finds necessary, this includes industrial planning and research agencies and he may appoint the personnel without regard to the Civil Service Laws.

Adjusting Headlamps on Oldsmobile Line

A new device for properly adjusting and aiming headlights is used on the assembly line at the Olds plant. It consists of three condensing lenses and a ground glass or target, on which latter there are horizontal and vertical lines. The test head is placed on a holder 2 ft. ahead of the headlamps on the assembly line. There are four heads, spaced for Sixes and Eights. The cars are driven onto a leveled, raised platform and the headlamps are turned on. The lenses

intercept the rays and condense them on the target, dividing the beam into three parts. Two of the lenses, located side by side in the upper half of the head, serve to gage the width of the beams, while the third, in the lower half, controls the height of the beams. The headlamps are aimed so that the beams are focused at the proper point on the target and then securely bolted in place. One man for each lamp can handle the capacity of the line.



Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

General business activity was maintained last week at about the best level thus far this year. As a result of more seasonal weather, retail buying showed an upturn. Spring merchandise enjoyed an active demand, and Easter buying was at a good level. Wholesale business also improved. There was a further expansion in industrial operations, while greater improvement is anticipated during this month.

Car Loadings Increase

Railway freight loadings during the week ended March 23 totaled 607,780 cars, which marks an increase of 10,348 cars above those during the preceding week, a decline of 2,258 cars below those a year ago, and an increase of 127,821 cars above those two years ago.

Current Production Gains

Production of electricity by the electric light and power industry in the United States during the week ended March 23 was 4.0 per cent above that in the corresponding period last year. Production during the preceding week was 4.7 per cent above that a year ago.

Grocery Sales at 4-Yr. High

Gains in sales of grocery store chains during recent weeks have brought them to the best level in four years. The index of store chain sales compiled by the "Chain Store Age" for February stands at 95.8, with the February average from 1929 through 1931 taken as 100.

Lumber Production Up 14%

New business booked at the lumber mills during the week ended March 23 was slightly larger than in the preceding

week and was 14 per cent above production. Shipments were moderately heavier than in the preceding week and surpassed those in the corresponding period last year by 13 per cent.

Crude Output Above U. S. Figure

Average daily crude oil production for the week ended March 23 amounted to 2,600,000 barrels, which was slightly above the Federal allowable figure, as against 2,608,400 barrels for the preceding week and 2,389,800 barrels for a year ago.

Fisher's Index

Professor Fisher's index of wholesale commodity prices for the week ended March 30 stood at 80.6, marking the sixth successive weekly decline. The current figure compares with 81.0 the week before and 81.7 two weeks before.

Federal Reserve Statement

The consolidated statement of the Federal Reserve banks for the week ended March 27 showed no changes in holdings of bills bought in the open market, discounted bills, and government securities. There was an increase of \$9,000,000 in monetary gold stocks and a decline of \$17,000,000 in money in circulation.

Chanter Heads New P-A Board; Launch Sales Drive

With reorganization of the Pierce-Arrow Motor Corp. approved by the federal courts announcement of the new company officials was made last week. A. J. Chanter, president of the old company, continues as president of the reorganized company and chairman of the board. Martin C. Ewald continues as secretary and treasurer, and Thomas J. O'Rourke is general sales manager.

J. Ernest Allen, former vice-president and director of Ulen & Co., former president of the Trent Process Corp. and also of the Archbald Coal Corp., is chairman of the executive committee. It is understood the directorate of the new Pierce-Arrow organization will include, besides Mr. Chanter and Mr. Allen, Kenneth Strachan, Ansley W. Sawyer, H. Bennett Sheets, Charles H. Diefendorf, Edward B. Germain, Charles M. Kennedy, Bayard F. Pope and Sheldon A. DuCret.

An aggressive sales campaign already has been launched by the company officers and

district sales meetings are being held in New York, Chicago, Philadelphia, Buffalo, Dallas, Los Angeles, San Francisco and other important points throughout the country.

AMA Starts Anti-Wagner Bill Campaign

(Continued from page 467)

and which could be held liable on agreements made by them or in their behalf.

"Labor organizations should be required to adopt and use sound accounting methods, subject to examination by appropriate public authority as to all funds received and disbursed," Mr. Graham declared. "Certainly no organization should be given the rights accorded by this bill without being held strictly accountable and responsible for the exercise and results of such rights, and without being subject to the jurisdiction and to the orders of our courts."

A recent report of the Automobile Labor Board showing that in the election of employee representatives in automobile plants, A. F. of L. votes were out-numbered by those of unaffiliated workers ten to one, was cited as evidence of the automobile

workers' attitude toward the Federation. Calling attention to the "majority rule" provision of the bill, Mr. Graham declared, "It is pertinent to inquire whether the American Federation of Labor genuinely favors such majority rule in the automobile industry. If so, on the basis of our recent elections, they have no standing whatsoever."

Powers granted to the National Labor Relations Board, which would be created by the bill, were also vigorously attacked by the motor industry's spokesman. "The Board is given very broad and arbitrary powers to regulate employer-employee relationships," he asserted. "It is given the power of complainant, prosecutor and judge, to mediate, conciliate, make inquiry on complaint or information from any source, and conduct trials without regard to the rules of evidence."

"Merit, not membership in a union should always be the basis of employment," was referred to by Mr. Graham as a fundamental American principle which would be jeopardized by the passage of the bill. "A man's labor affiliation or lack of such affiliation, should have no more to do with his job than his religion or his politics," he contended.

Poxson Visiting European, South African Dealers

Elijah G. Poxson, president of the Reo Sales Corp., sailed Saturday from New York for Gibraltar where he will leave the steamer Rex and board another ship for Capetown, South Africa. At Capetown he will confer with Reo distributors and dealers of the Union of South Africa and nearby markets. Mr. Poxson will then return to Europe for his second visit with Reo distributors in less than a year.

Haiti Trade Treaty Favors U.S. Automotive Products

Present favorable Haitian customs treatment for American automobiles, trucks, buses, automobile parts and accessories is bound for the life of the reciprocal agreement between the United States and Haiti signed on March 28. No date has yet been set for bringing the treatment into operation. It is subject to the approval of the Haitian Congress and will not become effective until 30 days after it has been proclaimed by the President of the United States and by the President of Haiti.

Exports of American automobiles to Haiti in 1929 totaled \$179,443 and in 1933 they amounted to \$104,714. Exports of automotive parts and accessories were \$67,132 and \$42,353 respectively, while exports of trucks and buses were valued at \$62,806 and \$28,692 respectively.

Olds Employs 5,315 Men, 60 Father and Son Pairs

Employment at the Olds Motor Works reached an all-time peak on March 29, with 5,315 men at work, according to factory officials. Sixty fathers and sons are employed in the factory, and the oldest employee is a man 88 years old, a factory report states.

Higher RR Rates May Boost Steel Prices

Increases May Hit Motor Buyers When 3rd Quarter Requirements Are Placed

While the steel market, at the beginning of this week's business, did not yet have a clear picture as to how much had been added to the cost of the various descriptions of steel by the Interstate Commerce Commission's approval of increased rail freight rates through "emergency charges," the fact that the Commission had authorized surcharges, ranging from 3 to 15 cents a net ton, on coal and coke, and of 10 cents a net ton on iron ore, stood out like a sore thumb.

This makes it certain that, regardless of how little may be added to rail freight bills in the form of higher rates on certain classes of finished steels, shipped as such from mills to consumers, the basic cost of steel making is appreciably enhanced. Forthwith the market's thoughts turned to the possibility of price advances in the third quarter. Depending somewhat upon the flow of business within the ensuing six weeks, the passing on of the increase in costs to steel buyers will become more and more of an outstanding problem as the second quarter becomes older. Meanwhile, although new commitments and specifications from automotive consumers are much lighter in volume, most of the finishing mills have sufficient tonnages



Control lubrication system for oiling 1000 engines simultaneously at the Dodge factory. The system has a capacity of 4500 gallons of oil, which is circulated and filtered through six clarifiers, each capable of purifying oil at the rate of 900 gallons per hour

of cold rolled flat steels on their order books to keep them busy well into May. This means that buyers, wanting to anticipate their third quarter demands as much as possible in the current quarter, in order to play safe, might encounter considerable difficulty in getting in under the wire before higher prices are chalked up. On the other hand, the condition brought about by the Interstate

Commerce Commission's ruling, affords to steel producers another opportunity to smoke out considerable business, that otherwise would be hanging fire for a long time, by giving the buyer a chance to cover his requirements before an advance in prices becomes effective.

Pig Iron—Takings by automotive foundries continue at a good rate. Blast furnace representatives and sales agents were not in a position early this week to form a clear picture as to how much the added cost per ton would be as the result of the I.C.C. emergency rate decision, the price enhancement of 44.8 cents per ton, which was mentioned in the New York market, pertaining solely to the additional cost of rail shipment of the finished iron, not taking into consideration the higher cost to furnaces of ores and fuels.

Copper—A much better tone prevails in the domestic market for copper and copper and brass products as the result of the accord reached by the world's producing interests. The gap between the "Blue Eagle" price of 9 cents and the "outside" market is continually growing narrower, the latter now being nominally quoted at 8½ cents.

Tin—Somewhat better a statistical showing, the world's visible supplies having been slightly curtailed in March, caused the market to open firm, with spot Straits tin quoted at 47.85 cents at the beginning of the week.

Lead—Storage battery manufacturers figured prominently among buyers this week. Producers are operating on a basis of daily sales quotas, adjusting prices to conform to this system. The New York market is quotable at 3.65 @ 3.70 cents.

Hartnet Promoted by Gilmer

The L. H. Gilmer Co. has promoted Daniel J. Hartnett to field supervisor of the Automotive Division. His activities will consist of working with district managers in various territories to promote sale of Gilmer Automotive Products.

Lukens Promotes Barnes

Walter E. Barnes has been appointed assistant to F. H. Gordon, vice president in charge of sales of Lukens Steel Co., Coatesville, Pa. Mr. Barnes joined the Lukens organization in 1910.

Manufacturers Adding Jobbers at Increasing Rate, MEMA Reports

Parts and equipment manufacturers are expanding the number of their jobber outlets at an accelerated rate, the average increase being greater in 1934 than the average in the four previous years, according to a survey just completed by the Motor and Equipment Manufacturers Association.

Of the 44 replies covering the entire five-year period received by the association from its manufacturer members, 24 were from replacement parts makers, seven from accessory companies, eight from shop equipment and service tool makers and five from chemical specialties organizations. These 44 manufacturers average 465 jobbers each in 1934, as compared with 441 in 1933, and 420 in 1929. The following table shows the average number of jobber outlets reported by the different groups:

	Average Number of Jobbers		
	1934	1933	1929
24 replacement parts makers	464	460	441
7 accessory companies	353	310	315
8 shop equipment makers	614	561	489
5 chemical specialty..	390	337	333

Five of the parts companies had fewer jobbers in 1933 than 1929 and seven had fewer wholesalers in 1934 than in 1933. Three of the accessory group had fewer jobbers in 1933 than in 1929, but all but one of these manufacturers increased their outlets in 1934, the exception having the same number in 1934 and 1933. Among the shop equipment and tool companies, two had fewer outlets in 1933 than in 1934, but all of them added outlets in 1934 with one exception who had the same number.

The MEMA says that it believes a more comprehensive survey would show considerably greater rates of increases inasmuch as the figures of companies with more liberal jobbing policies were not made available.

Commenting on the results, A. H. Eicholz, general manager of the MEMA, says "The large and significant decreases in jobbing outlets on the part of some manufacturers naturally kept the average increase of all manufacturers down considerably. These decreases represent deliberate changes in policy—adoption of program of selective distribution. While not all lines of automotive merchandise are adaptable to selective distribution we cannot help feel that it is a policy worthy of the consideration of many more manufacturers as a means of cutting down sales expenses, credit losses, and jobber vs. jobber competition."

Mr. Eicholz also mentions the practices of a few manufacturers in accepting orders for "initial stocks" from every new jobbing account starting in business. After such recognition, he says, there are in many cases no subsequent orders, but other manufacturers are led to recognize the new outlets to the detriment of existing jobbers.

Recent Developments in Diesel Engines, and on Fuel-Injection Equipment. On April 2 four papers will be presented including one on Fuels for Diesel Engines by T. B. Rendel and one on Knock Rating of Diesel Fuels by Howard Wiles. There will also be a demonstration of knock-rating tests with the CFR engine. Four papers are on the program also for the third day, including one on The Fuel-Injection, Spark-Ignition Engine by C. E. Frudden of the Allis-Chalmers Mfg. Co., one on Diesel Tractor Engines by C. L. McMullen of the Caterpillar Tractor Co., and one on Transportation Costs with Diesel Trucks and Buses by Professor Ralph A. Moyer.

A feature of the conference will be an exhibition of Diesel engines, Diesel-powered machinery, accessories, equipment and supplies.

Industry Urged to Unite In Safety Education Drive

Believing that the automobile industry can accomplish much in a public campaign of safety education to reduce the increasing toll of traffic accidents throughout the nation, Robert C. Graham, executive vice-president of the Graham Paige Motors Corp., has asked all Graham dealers and employees to cooperate in a comprehensive safety-first program.

Mr. Graham declared that if the industry, with its millions of workers and far-reaching facilities for personally contacting the automobile public, united in a concerted drive to eliminate the careless or untrained driver, the effort would save thousands of lives and injuries this year besides millions of dollars in unnecessary property damage.

Pontiac Using 18,900 Oz. of Silver in 150,000 Cars

Pontiac calculates that 18,900 oz. of silver will be required for the cadmium silver bearings in the 150,000 cars it expects to make this year. That is at the rate of 0.126 oz. per car.

Propose Amending Wage Provision of Truck Code

The National Industrial Recovery Board has announced the trucking industry Code Authority has applied for approval of a code amendment providing minimum wage rates for rate clerks and dispatchers ranging from \$18 weekly in cities over 500,000 to \$16.80 in cities of less than 250,000. Suggestions or objections to the proposed amendment must be filed with Deputy Administrator C. P. Clark at Washington, before April 22.

Diesel Power Conference At Iowa State Next Week

A three-day conference on Diesel power will be held at Iowa State College, Ames, April 10, 11 and 12. It is designed to meet the need for information on Diesel engines of power users generally, and particularly contractors, engineers of public works and highway commissions, truck and bus line operators, etc.

During the first day there will be talks on the Principles of the Diesel Engine, Some

Jack Joins Johns-Manville

William A. Jack, 3rd, formerly with Burgess Battery Co., is now located at the acoustical laboratories of Johns-Manville Co. Mr. Jack is well known in many quarters for his contributions to automotive acoustic research and development.

Chevrolet, W-O Workers to Vote for Bargainers

Chevrolet and Willys-Overland workers in the Toledo plants will vote next Tuesday for collective bargaining representatives, D. R. Wilson, Willys receiver has announced. The election will be under the sponsorship of the Automobile Labor Board.

Spicer Mfg. Co.

A net profit of \$669,800 was reported by Spicer Manufacturing Corp. for 1934, and compares with a net loss of \$130,698 for the previous year.

Pontiac Seeks Accident Reduction by Prevention

Pontiac Motor Co. is inaugurating an accident prevention campaign this month with two trophies to be awarded to the groups making the best safety record following the close of the contest Dec. 31. All departments have been placed in 12 groups for the purpose of equalizing the accident hazard. The trophies will be awarded, (1) to the group showing the greatest improvement in accident prevention for the last nine months of 1935 over like period of 1934, and (2) to the group with the highest standing in accident prevention.

The following formulae will be employed to compute group standings which will be issued in the form of monthly reports:

Number of accidents X 1,000,000
Number of hours worked = Frequency of accidents.

Number of days lost X 1000 = Number of hours worked
Severity of accidents for the group.

For the purpose of the Pontiac accident prevention campaign the competitive standings are established by multiplying the frequency rating by the severity rating.

February Labor Turnover Decreased from Last Year

The February turnover per 100 employees in the automotive industry, according to the Department of Labor, showed the quit rate, while slightly greater than for the previous month, was approximately one-half that for February of 1934. The discharge rate was reduced by more than half last month over the corresponding month of last year and the lay-off rate for February also showed a measurable decrease from February of last year, but an increase over January. The total separation rate per 100 employees dropped considerably under the corresponding period of 1933. This factor, however, was offset by a higher accession rate for the month. The accompanying table shows the Labor Department's report in detail.

Monthly Turnover per 100 Employees		
Feb., 1935	Jan., 1935	Feb., 1934
Quit	1.62	1.96
Discharge .....	.29	.37
Lay-off	2.33	1.27
Total separation	4.24	4.05
Accession	5.76	17.61
		20.17

Louis Mendelsohn

Louis Mendelsohn, one time treasurer and board chairman of the Fisher Body Corp., died last week at the Breakers Hotel, Palm Beach, Fla. Mr. Mendelsohn was 81 years old.

An architect by profession, Mr. Mendelsohn became associated with the automotive industry in its early days at Detroit. It is said his influence on plant design was considerable and that many of his buildings became patterns for the constantly expanding industry. It was in 1909 that he became associated with the Fisher organization, maintaining an active interest in the corporation's affairs until 1926 when the business became a unit of General Motors.

Mr. Mendelsohn was twice married. His first wife was Lydia Benda, whom he married in 1881. Two sons were born of this union, Gordon and Paxton C. The second Mrs. Mendelsohn, who survives, was Evelyn Dumas, whom Mr. Mendelsohn married in 1903. A daughter, the present Mrs. C. Henry Buhl, was born of this marriage. All three of Mr. Mendelsohn's children survive him.

Packard Reveals Cost of Introducing "120"

\$7,290,549 Net Loss in 1934 Due to Costs of Launching the New Lines

The cost of introducing the new Packard "120" is reflected in the financial statement of the Packard Motor Car Co. for the year of 1934. Where a net profit of \$506,433 was reported for 1933 the 1934 report shows a net loss of \$7,290,549.

The loss reflected the extraordinary expenses incidental both to bringing out the new line of lower priced cars and the inauguration of a new style for the higher priced units. This required heavy outlays for tools and dies; furthermore, the report indicates that 1934 operations were unprofitable because of low sales volume during the year. Sales dropped to \$14,618,742 in 1934 from \$19,229,789 the previous year. At the same time sales costs rose from \$15,643,454 in 1933 to \$17,315,065 last year. There also is reported an increase in selling and administrative expenses to \$2,094,875 last year from \$1,618,875 the previous year.

Alvan Macauley, president, said a break down of the 1934 loss is approximately accounted for as follows: expense incidental to model 120, \$3,541,500; twelfth series tools, \$1,559,975; branch losses due to low volume, \$438,827, and factory loss due to low volume \$1,750,247.

As of Dec. 31 the company reported its current position to be

	1934	1933
Current assets	\$18,656,432	\$22,251,923
Current liabilities ..	4,695,269	2,239,623
Working capital	13,961,163	20,012,300

Creditors Spike Rumor Of W-O Reorganization

Reported \$10,000,000 New Company Formation Denied by Committee's Counsel

While Toledo newspapers carried reports to the effect that progress is being made towards a reorganization of the Willys-Overland Co., with possibility of \$10,000,000 in new capital, representatives of the creditors' committee denied that any specific proposal has yet been submitted.

The current report involved a plan by which creditors would accept 50 per cent of their claims in common stock of the reorganized company and that John N. Willys would put in a portion of the new money.

"No proposition of 50 cents on the dollar in stock of a reorganized company has been submitted to the creditors at any time by anybody," declared John J. Kendrick, counsel and assistant secretary of the creditors' committee.

"However, counsel for the creditors' committee are working on plans for reorganization of the company but refuse now to discuss the terms or conditions."

Toledo Employment Moves Upward; W-O in Production

Employment took an upward trend in Toledo this week due in part to resumption of production by Willys-Overland Co. About 1800 men are now employed in that plant and approximately 400 cars will come off the line this week.

In a group of Toledo plants which report weekly payrolls the total employment stood at 18,614 at the close of the week for a gain of 20 over the previous week. This was a reversal of a downward trend since mid-February.

Briggs Mfg. Co.

Briggs Mfg. Co. has reported for 1934, a net profit of \$5,121,625, which compares with a net profit for 1933 of \$1,591,425.

CALENDAR OF COMING EVENTS

SHOWS

Machine Tool Exposition—Cleveland
Sept. 10-21

CONVENTIONS AND MEETINGS

American Gas Association, New York, April 13-14
American Chemical Society, New York, April 22-26
American Welding Society, Annual Meeting—New York City.....April 25
U. S. Chamber of Commerce Annual Meeting, Washington, D. C. Apr. 29-May 2
American Society of Mechanical Engineers (National Oil and Gas Power Meeting), Tulsa, Okla. May 8-11
National Battery Manufacturers Assoc. Spring Convention, Cleveland, May 22-23

Automotive Engine Rebuilders Assoc. —Indianapolis May 27-30
S.A.E. Summer Meeting—White Sulphur Springs, Va. June 16-20
American Society for Testing Metals, Detroit June 24-28
American Society for Metals, Annual Meeting—Chicago Sept. 30-Oct. 4
National Safety Council, Louisville, Ky. October 14-18
American Gas Association—Atlantic City Oct. 14-18
American Petroleum Institute—Los Angeles Nov. 11-14
National Industrial Traffic League—Chicago Nov. 20-21

RACES

Race—Indianapolis Race, Indianapolis, May 30

PAA Full-Year Dealer Profit Cuts in Excess

Condensed Consolidated 1933 and 1934 Operating Statements for 255 Pennsylvania Dealers and Distributors

		(000 Omitted)															
All Dealers	Sales	Total		Wholesale Cars		Retail Cars		Used Cars		Retail and Used Cars		Service		Stockroom Misc. Sales			
		1933	1934	1933	1934	1933	1934	1933	1934	1933	1934	1933	1934	1933	1934		
	Sales	\$49,796	\$59,576	\$4,134	\$5,154	\$24,973	\$30,076	\$11,494	\$13,544	\$36,468	\$43,619	\$3,719	\$4,403	\$4,891	\$5,779	\$585	\$620
	Gross profit or loss	8,754	10,559	261	300	5,861	6,355	—758	—18	5,103	6,336	1,863	2,109	1,328	1,616	198	197
	Expense	8,215	9,860	120	129	3,254	4,113	1,948	2,290	5,203	6,404	1,724	1,977	869	1,007	300	344
	Operating net profit or loss	539	699	141	171	2,607	2,242	—2,706	—2,308	—100	—68	139	132	459	609	—102	—147
	Final net profit or loss	276	411	including \$250 in 1933 and \$310 in 1934, profit on finance reserve (000 omitted)													
58 Ford Dealers	Sales	8,216	12,423	13	113	4,333	6,803	1,877	2,947	6,211	9,750	751	937	1,178	1,532	64	90
	Gross profit or loss	1,497	2,277	....*	17	818	1,309	—68	35	750	1,345	348	392	345	458	54	65
	Expense	1,558	2,158	....†	....†	647	960	282	432	930	1,392	309	346	267	331	52	89
	Operating net profit or loss	—61	119	....*	17	171	349	—350	—397	—180	—47	39	46	78	128	2	—24
	Final net profit or loss	—43	130	including \$39 in 1933 and \$74 in 1934, profit on finance reserve (000 omitted)													
76 Chevrolet Dealers	Sales	15,763	17,273	255	158	8,664	9,477	4,258	4,569	12,922	14,046	1,051	1,249	1,328	1,583	207	237
	Gross profit or loss	2,812	3,161	23	18	2,102	2,058	—288	—43	1,814	2,015	570	647	348	430	56	50
	Expense	2,543	2,917	5	5	1,076	1,254	719	776	1,795	2,031	497	592	219	254	27	35
	Operating net profit or loss	269	244	18	13	1,026	804	—1,007	—819	20	—16	73	55	129	176	29	15
	Final net profit or loss	201	165	including \$105 in 1933 and \$113 in 1934, profit on finance reserve (000 omitted)													
57 Buick, Olds., Pontiac and Cadillac Dealers	Sales	12,667	14,074	472	538	6,643	7,477	3,043	3,265	9,686	10,742	1,169	1,314	1,223	1,357	118	124
	Gross profit or loss	2,441	2,781	19	23	1,707	1,705	—301	—64	1,406	1,640	626	634	352	295	38	39
	Expense	2,247	2,583	2	....	809	1,011	541	593	1,349	1,604	607	677	197	210	91	92
	Operating net profit or loss	194	199	17	.23	898	694	—842	—657	57	36	19	7	155	185	—53	—53
	Final net profit or loss	94	79	including \$60 in 1933 and \$65 in 1934, profit on finance reserve (000 omitted)													
18 Dodge-Plymouth Dealers	Sales	5,106	6,313	1,453	1,781	2,179	2,730	803	1,007	2,982	3,737	244	316	376	436	52	43
	Gross profit or loss	813	962	93	104	519	564	—23	16	496	580	114	144	100	125	11	9
	Expense	687	859	39	39	291	376	155	199	446	575	117	142	67	80	19	23
	Operating net profit or loss	126	103	54	65	228	188	—178	—183	50	5	—3	2	33	45	—8	—14
	Final net profit or loss	59	58	including \$13 in 1933 and \$21 in 1934, profit on finance reserve (000 omitted)													
19 Chrysler-Plymouth Dealers	Sales	4,057	5,161	1,460	2,056	1,410	1,665	665	841	2,075	2,506	146	194	294	346	82	59
	Gross profit or loss	536	640	97	108	310	330	—23	15	287	345	62	82	66	87	25	19
	Expense	483	584	50	61	169	224	103	121	273	346	58	78	57	61	45	38
	Operating net profit or loss	53	56	47	47	141	106	—126	—106	14	—1	4	4	9	26	—20	—19
	Final net profit or loss	65	57	including \$16 in 1933 and \$19 in 1934, profit on finance reserve (000 omitted)													
27 Dealers Handling Other Lines	Sales	3,988	4,331	481	507	1,743	1,924	849	915	2,592	2,839	359	393	493	526	62	67
	Gross profit or loss	654	736	29	29	405	388	—55	23	360	411	143	160	118	120	15	16
	Expense	697	759	24	24	263	287	148	169	411	456	137	142	60	71	65	66
	Operating net profit or loss	—43	—23	5	5	142	101	—203	—146	—61	—45	6	18	58	49	—50	—50
	Final net profit	—101	—78	including \$17 in 1933 and \$17 in 1934, profit on finance reserve (000 omitted)													

Survey Shows New Car Gross of Code Used Car Savings

by Don Blanchard
Editor, *Automotive Industries*

THE code cut the gross loss on used cars sustained by 255 Pennsylvania dealers, from \$785,000 in 1933 to \$18,000 in 1934 in the face of a 20 per cent increase in new car volume and an 18 per cent increase in used car sales. If it is assumed that without the code, used car losses would have been at least as large in relation to sales as in 1933, then the gross code saving (before expense) amounted to \$913,000.

But these savings on used cars were offset by reduced gross profit on new cars resulting mainly from lower margins on accessories and smaller mark-ups on freight and handling. As a consequence, the reporting dealers received \$805,000 less gross profit on retail new cars and \$28,000 less gross on wholesale new cars—a total of \$833,000—than they would have received on 1934's larger volume, had discounts,

mark-ups, etc., been maintained at 1933 levels.

The reductions in new car gross profits, therefore, exceeded the actual code savings on used cars by \$93,000 and were but \$80,000 less than the calculated savings.

On gross sales of \$59,576,000 in 1934, the 255 dealers earned a final net profit of \$411,000, or 0.689 per cent on the volume. In 1933 on gross sales of \$49,796,000, they earned \$276,000, or 0.554 per cent. Included in these earnings are profits on finance reserves of \$310,000 in 1934 and of \$250,000 in 1933; without these financial profits, net earnings would have been \$101,000 and \$26,000 respectively.

While car sales—wholesale, retail and used—contributed roughly 82 per cent of the gross volume, non-car departments in both years yielded better than 38 per cent of the total gross

profit and 92 per cent in 1933 and 85 per cent in 1934 of the total operating net profit.

The foregoing comparisons are based on data presented in a copyrighted survey made by Edward Payton and released this week by the Pennsylvania Automotive Association. Much of the information developed by the survey is presented in the accompanying tables. Complete copies of the survey may be obtained from the Association at Harrisburg at prices ranging from \$1 for single copies down to 25 cents each in lots of 100 or more.

In the survey the reporting dealers are divided into six groups according to the make of car handled, and of these groups only the Ford dealers show an increase in retail new car gross profit—from 18.88 per cent of sales in 1933 to 19.24, a gain of .36 per cent of sales. Applying the 1933 ratio of cost of

Rates of Gross, Expense and Net to Sales—Cars

	Total—255 Dealers		58 Ford Dealers		76 Chevrolet Dealers		57 Buick, Olds, Pontiac, Cadillac Dealers		18 Dodge Dealers		19 Chrysler Dealers		27 Varied Lines	
	1933	1934	1933	1934	1933	1934	1933	1934	1933	1934	1933	1934	1933	1934
As per cent of wholesale car sales:														
Gross profit, wholesale cars	6.321	5.542	.....	.....	9.22	11.65	.....	4.28	6.37	5.84	6.61	5.25	6.05	5.78
Expense, wholesale cars	2.893	2.087	.....	.....	1.95	3.20	.....	.....	2.66	2.21	3.40	2.98	4.99	4.65
Net profit or loss, wholesale cars	3.428	3.455	.....	.....	7.27	8.45	.....	4.28	3.71	3.63	3.21	2.27	1.06	1.13
As per cent of retail, new car sales:														
Gross profit, retail new cars	23.468	21.128	18.88	19.24	24.26	21.71	25.68	22.80	23.82	20.65	21.94	18.83	23.22	20.17
Expenses, retail new cars	13.031	13.676	14.93	14.11	12.85	13.23	12.17	13.52	13.34	13.76	12.00	13.46	15.06	14.93
Net profit or loss, retail new cars	10.437	7.451	3.95	5.13	11.41	8.48	13.51	9.28	10.48	6.89	9.94	6.37	8.16	5.24
As per cent of used car sales:														
Gross profit or loss, used cars	—6.596	—0.133	—3.65	1.20	—6.75	—0.73	—9.88	—1.97	—2.90	1.60	—3.41	1.73	—6.50	2.53
Expense, used cars	16.947	16.909	15.04	14.66	16.90	16.99	17.77	18.15	19.28	19.89	15.53	14.40	17.43	18.45
Net profit or loss, used cars	—23.543	—17.042	—18.69	—13.46	—23.65	—17.72	—27.65	—20.12	—22.18	—18.29	—18.94	—12.67	—23.93	—15.92
As per cent of combined new car retail and used car sales:														
Gross profit, retail new and used cars	13.991	14.526	12.07	13.79	14.04	14.34	14.51	15.27	16.62	15.52	13.82	13.75	13.48	14.48
Expense, retail new and used cars	14.266	14.680	14.96	14.28	13.88	14.46	13.93	14.93	14.94	15.37	13.13	13.79	15.85	16.06
Net profit or loss, retail new and used cars	—0.275	—0.154	—2.89	—0.49	0.16	—0.12	0.58	0.34	1.68	0.15	0.69	—0.04	—2.37	—1.58

sales to 1934 cost of sales, it develops that this increase in margin added \$30,000 to the retail new car gross profits of the Ford dealers in 1934. As mentioned previously, the total new car gross profit reduction of the 255 dealers amounted to \$805,000 on retail sales. Adding the Ford increase to this figure, it is obvious that the decrease in retail new car gross profit sustained by non-Ford dealers, had 1933 ratios applied to 1934 sales, amounted to \$835,000.

In the following table what Mr. Payton calculates the lower gross profit margins on 1934's larger sales cost the non-Ford groups is compared with the actual gross savings (before expense) credited to the code:

Group	Reduction In New Car Gross Profit (000 Omitted)	Code Savings on Used Cars (000 Omitted)	Difference (000 Omitted)
Chevrolet	\$318	\$245	— \$73
Buick, Olds, Pontiac, Cadillac	290	237	— 53
Dodge-Plymouth	113	39	— 74
Chrysler-Plymouth	39	38	— 1
Others	75	78	— 3
Totals	\$835	\$637	— \$198

According to the foregoing, the reduction in retail new car gross profit on the non-Ford groups exceeded actual code savings by \$198,000. The excess is less if it is assumed that without the code used car losses on 1934 volume would have been at the same rate as in 1933. In that case, code savings would amount to \$778,000, or \$111,000 less than the reduction in new car gross profit.

Of course, it may be contended that if new car gross margins had not been reduced, the public would have had to pay more for new cars last year and as a result sales would have been smaller. Very likely that would have been the case. But on the basis of the survey data, the increased volume does not seem to have benefited the majority of the reporting dealers.

As one of the accompanying tables shows, the group had increases of \$5,104,000 in retail new car sales, of \$2,049,000 in used car sales and of \$7,153,000 in combined new and used car sales. The increase in new car sales was accompanied by increases of \$493,000 in gross profit and \$857,000

in expense, with the result that retail new car net profits were \$364,000 smaller than in 1933. Used car sales went up \$979,000, used car gross loss went down \$740,000, used car expense decreased \$192,000 and used car net loss was cut \$398,000. The result of it all was that on \$7,153,000 more new and used car volume the reporting dealers made \$34,000 more than in 1933.

The foregoing analysis is obscured by the inclusion of the Ford figures. The non-Ford dealers, as the table shows, increased their sales \$2,634,000, got only \$3,000 more in new car gross profit, paid out \$544,000 more in expense and were \$541,000 worse off in new car net profit than in 1933. This was largely offset by a reduction of \$445,000 in used car net loss, so that on an increase of \$3,613,000 in new and used car sales they fell \$96,000 short of doing as well as in 1933.

Consequently if the lower prices resulting from reduced new car margins did increase volume, the larger sales appear to have hurt rather than helped the reporting non-Ford dealers. In-

New and Used Car Sales, Gross Profits, Expenses and Net Profits PER NEW UNIT SOLD—1933 and 1934

	255 Dealers		58 Ford Dealers		76 Chevrolet Dealers		57 Buick, Olds, Pontiac and Cadillac Dealers		18 Dodge, Plymouth Dealers		19 Chrysler-Plymouth Dealers		27 Varied Line Dealers	
	1933	1934	1933	1934	1933	1934	1933	1934	1933	1934	1933	1934	1933	1934
Retail new car units	32,665	38,568	6,281	10,356	13,314	13,651	6,469	7,045	2,848	3,379	1,871	2,107	1,885	2,030
Used car units	59,167	65,261	9,902	15,218	24,714	23,564	13,183	13,307	4,169	4,836	3,415	4,200	3,781	4,136
Retail														
New car sales	\$764.53	\$779.80	\$689.88	\$656.95	\$650.76	\$694.26	\$1,026.91	\$1,061.30	\$765.13	\$807.83	\$753.83	\$790.12	\$924.83	\$947.55
New car gross profit	179.42	164.76	130.30	126.41	157.90	150.79	263.80	241.98	182.27	166.89	165.45	156.73	214.77	191.16
New car expense	99.63	106.65	103.04	92.73	80.81	91.90	124.99	143.56	102.10	111.20	90.49	106.37	139.34	141.48
New car net profit or loss	79.79	58.11	27.26	33.68	77.09	58.89	138.81	98.42	80.17	55.69	74.96	50.36	75.43	49.68
Used car sales	351.88	351.16	298.91	284.52	319.82	334.67	470.33	463.40	281.81	298.10	355.19	399.25	450.35	450.92
Used car gross profit or loss	—23.21	—47	—10.90	3.41	—21.61	—3.15	—46.50	—9.13	—8.18	4.75	—12.11	6.90	—29.28	11.43
Used car expense	59.64	59.37	44.95	41.72	53.97	56.87	83.62	84.13	54.35	58.86	55.18	57.51	78.53	83.21
Used car net loss	—82.85	—59.84	—55.85	—38.31	—75.58	—60.02	—130.12	—93.26	—62.53	—54.11	—67.29	—50.61	—107.81	—71.78
New and used car sales	1,116.41	1,130.97	988.79	941.47	970.56	1,028.93	1,497.24	1,524.70	1,046.94	1,105.93	1,109.02	1,189.38	1,375.19	1,398.47
New and used car gross profit	156.21	164.29	119.40	129.82	136.29	147.64	217.30	232.85	174.08	171.64	153.34	163.63	185.49	202.60
New and used car expense	159.27	166.03	147.99	134.45	134.78	148.77	208.61	227.69	156.45	170.06	145.68	163.88	217.88	224.69
New and used car net profit or loss	—3.06	—1.74	—28.59	—4.63	1.51	—1.13	8.69	5.16	17.63	1.58	7.66	—.25	—32.39	—22.09
Final net profit or loss All departments	6.85	8.76	—6.81	13.52	15.10	12.10	14.57	11.19	10.84	8.93	14.20	10.71	—38.71	—28.30
Profit on finance reserve	7.65	8.02	6.20	7.11	7.91	8.30	9.23	9.29	4.61	6.15	8.47	9.10	8.94	8.42
Final net profit or loss without finance reserve	—.80	.74	—13.01	6.41	7.19	3.80	5.34	1.90	6.23	2.78	5.73	1.61	—47.65	—36.72

1934 INCREASES and DECREASES in New and Used Car Sales, Gross Profits Expenses and Net Profits

000 Omitted

	New Cars Retail				Used Cars				New Cars Retail and Used Cars			
	Increase in Sales	Increase in Gross Profit	Increase in Expense	Increase in Net Profit or Reduction in Net Loss	Increase in Sales	Code Savings on Used Cars	Increase in Expense	Reduction in Loss	Increase in Sales	Increase in Gross Profit	Increase in Expense	Increase in Net Profit or Reduction in Net Loss
58 Ford dealers	2,470	490	313	178	1,070	103	150	47†	3,540	593	463	130
76 Chevrolet dealers	813	— 44	178	— 222*	311	245	57	188	1,124	201	235	— 34*
57 Buick, Olds, Pontiac, Cadillac dealers	834	— 2	202	— 204*	222	237	52	185	1,056	235	254	— 19*
18 Dodge dealers	551	45	85	— 40*	204	39	44	5†	755	84	129	— 45*
19 Chrysler dealers	255	21	55	— 35*	176	38	18	20	431	58	73	— 15*
27 Dealers handling other lines	181	— 17	24	— 41*	66	78	21	57	247	61	45	16
Total except Ford dealers	2,634	3	544	— 542*	979	627	192	445	3,613	640	736	— 96
Total	5,104	493	857	— 364*	2,049	740	342	398	7,153	1,233	1,199	34

*Decrease in net profit or increase of net loss, or a net profit in 1933 becomes a net loss in 1934. †Increase.

cidentally, in this connection, it is worthy of mention that the average new car selling price for the entire 255 dealers actually was \$14.97 higher than in 1933. The dealers' average cost of new car sales, however, went up \$29.93, or approximately double the increase in the price charged the public.

The expense trends presented by the survey are mixed. Wholesale expense was down 0.806 per cent to 2.087 per cent; new car retail was up 0.645 to 13.676; used car expense decreased 0.038 per cent to 16.909; new and used car combined increased 0.414 to 14.680; service expense declined 1.460 per cent to 44.893; stockroom expense was down 0.341 to 17.420; and other expense up 4.138 per cent to 55.423. Total expense was up 0.054 to 16.550.

The information developed by the survey is presented very comprehensively in the accompanying tables and there is no need to discuss the figures in further detail here. In general, if the survey is accepted as approximately typical in its portrayal of conditions in the retail field, it is clear that dealers need a higher rate of gross profit on retail new car sales and/or a lower rate of loss on used cars, if their car selling operations are to be put on a sound basis, which they are not now since without finance reserve profits the reporting dealers barely broke even last year. Steps have been taken this year on some lines to restore a part at least of gross profit reductions effected last year, but with the code showing strong signs of disintegrating altogether, it is more than a possibility that used car losses will be larger than in 1934.

In the long run, the answer to the problem, lies in a better balance be-

tween production and demand and in the more scientific appointment of dealers. These are the fundamental causes of unprofitable automobile retailing. They cannot be cured by juggling new car discounts or attempting to control used car allowances, since they combine to determine what the ratio of gross profit on car sales shall be. This fact does not get the attention it deserves, largely because dealer accounting makes an arbitrary separation of new and used car sales when the two are inextricably tangled.

The vital figure is the percentage of gross profit on combined new and used

car sales. Too many new cars produced will push it down below the profit point nationally, and in a particular territory, the appointment of too many dealers will do likewise. Too many new cars and too many dealers in some territories—either or both—give the public the whip hand in determining what gross profits on car sales shall be. Under such conditions, upping new car discounts or reducing used car losses won't change the situation much because as one goes up and the other goes down—the final figure is about the same.

Savings in Metal by Taking Light Cuts Under Scale

The savings in metal which can be obtained when using cemented carbide tools, by reducing the depth of surplus metal ordinarily provided in castings as an allowance for machining, offers an opportunity for worthwhile economies.

When making sand castings it has been customary, due to the hard, tough scale, to provide sufficient surplus metal to permit the tool to take a deep cut under the scale. This was essential when using steel tools because of the excessive tool wear which occurred when light cuts were taken through the highly abrasive, tough scale. However, it has been found that cemented carbide tools can be used

to take an extremely light cut just under the scale of sand castings. In some cases, even a skim cut through the scale can be made with economical results.

A well-known manufacturer of air brakes adopted one 5-in. and two 7-in. Carboloy cutters for milling two types of cast iron valve bodies. They found that with Carboloy, the casting size could be reduced 1/16 in. on all faces to be milled. The result is a net annual saving of \$4,587.70. Carboloy blade consumption per yearly production of parts costs \$144.30, based on an average of 3200 pieces per grind, with .005 in. stock removed in grinding.

The Production of Steel



Fig. 1—View of body to show the steel underbody which in combination with the steel roof panel produces an all-steel construction assembly

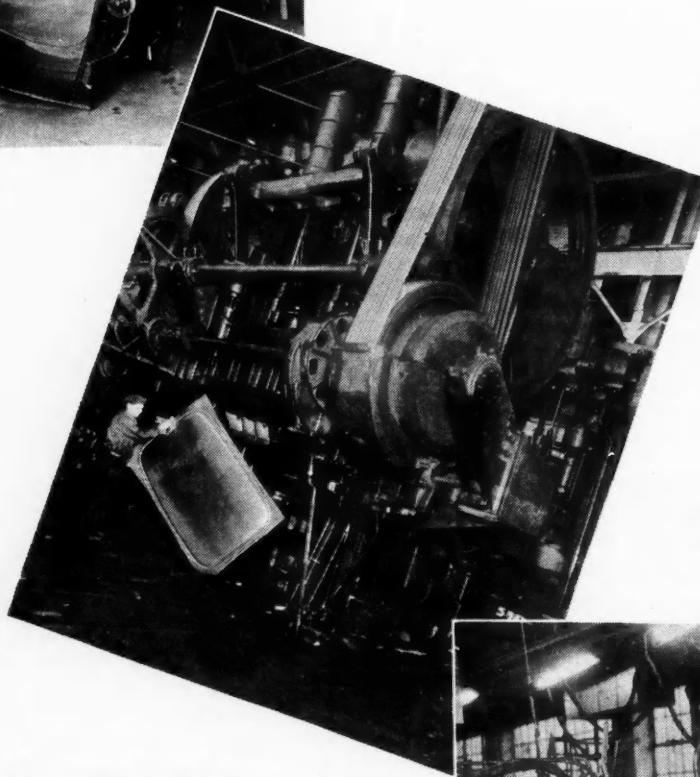


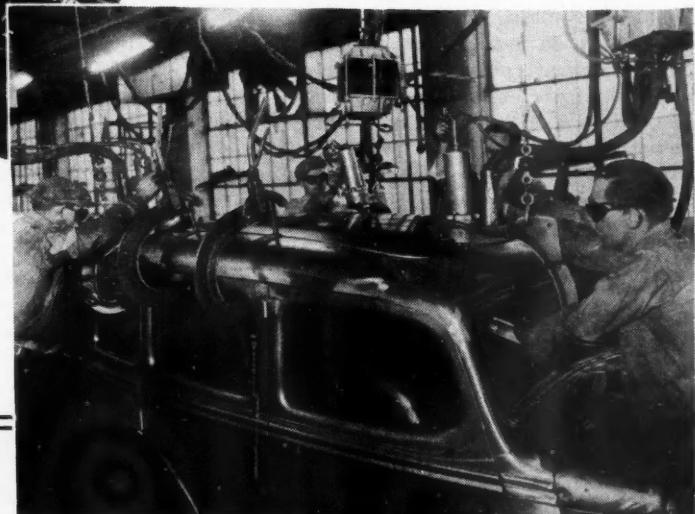
Fig. 2—Roof panel shown alongside the drawing press prior to the trimming operation

WITH the use of a steel roof on 1935 Hudson and Terraplane bodies, Hudson is now supplying the public with a line of body models which are of steel construction throughout. This is brought out in Fig. 1, showing the long steel underbody which completes the metal closure at all points. The body structure now embodies a unit steel front section, steel body panel and door panel framing, steel roof, and steel underbody.

The various units of the structure are welded together by techniques most suitable to each point of application. Welding operations include flash, spot, gas and arc.

One of the questions asked most frequently concerning steel roof bodies refers to the method of sound-proofing. At Hudson this has been attacked from two directions. First, the use of rubber mounting for the engine and other chassis units has eliminated one of the largest sources of noise by preventing the transfer of vibrations into the body. In addition, steps have been taken to insulate the body itself. The top is insulated by blue quilted padding between the steel roof and the lining; jute pads are used under the carpet, the dash fin-

Fig. 3—(Below) Roof panel is clamped in place and then spot welded by means of the overhead welders



Roof Bodies at Hudson

by Joseph Geschelin
Technical Field Editor, Automotive Industries

ish board, and on the cowl sides. It is also found that while the bodies are entirely free of drumming, the insulating material provides thermal protection, as well as the elimination of resonance effects.

As shown in Fig. 2 the roof section is a single stamping flanged to fit into the flange formed at the roof opening by the main stampings. The roof section is applied along the metal finishing line, pressed into place and held firmly by the large C-clamps shown in Fig. 3. Then the panel is spot-welded around the roof opening by means of the portable welders suspended overhead.

The joint at the roof opening leaves a space wide enough to permit the free entrance of the welding electrodes. After welding, the space is filled with a plastic filler under pressure from a heavy spray gun and the roof line finished off with a wide rubber molding which is rolled into the filler with a cork hand roller.

The 1935 Hudson is now a truly all-steel body featuring great strength and safety. And yet, despite the early fears concerning the use of a steel roof, this body strikes a new high for comfort and freedom from noise and vibration.

Fig. 4—(Below) Plastic filler forced under pressure into the roof joint

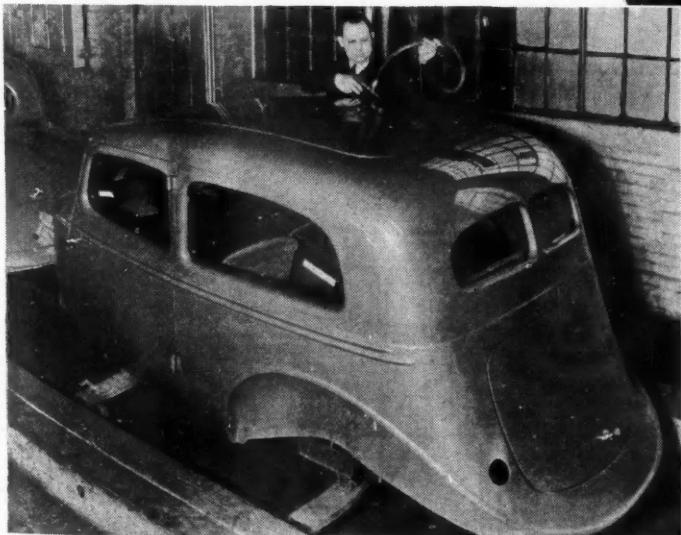
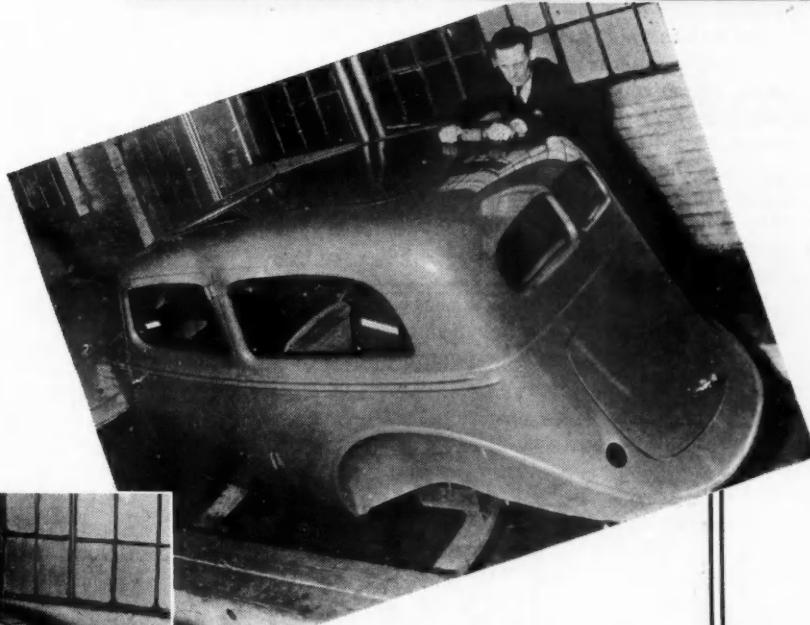


Fig. 6—(Top) Pyrotechnic display at the big flash welder which is used to finish the joints at the rear panel

Fig. 5—(Above) Rubber molding which finishes off the roof line is rolled in with a cork hand roller



Planetary Transmission with Control Offered Optionally

A HYDRAULICALLY CONTROLLED planetary transmission known as the de Normanville safety gear is being offered as an option at \$150 extra on three models of the Humber cars this year. Each of the gear trains comprises a sun gear, a number of planetary pinions meshing therewith, and a ring gear with internal teeth which also meshes with the planetaries. Each geared speed is engaged by holding one member of the planetary assembly from rotating by means of a brake, and the feature of the transmission consists in the manner in which the brakes are applied.

Control is partly by a preselecting lever on a quadrant on the steering wheel, which controls a cam mechanism inside the gear box and is inter-connected with the clutch pedal in such a way that the lever is locked in position unless the clutch pedal is depressed. This, however, does not prevent shifting from high gear into neutral and vice versa at any time.

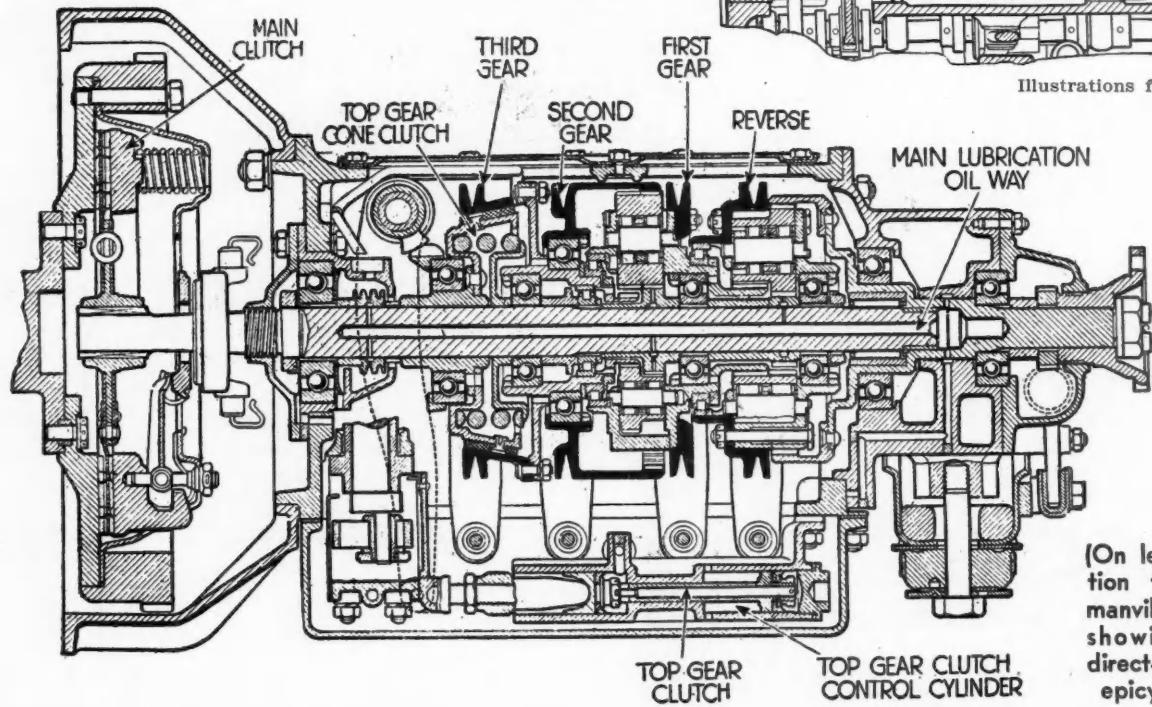
There is a second connection between the gear lever and the clutch pedal by which, if the gear lever is placed in

the neutral position, a dashpot comes into action which retains the clutch in the disengaged position so that when the engine is idling the gears are stationary and therefore silent.

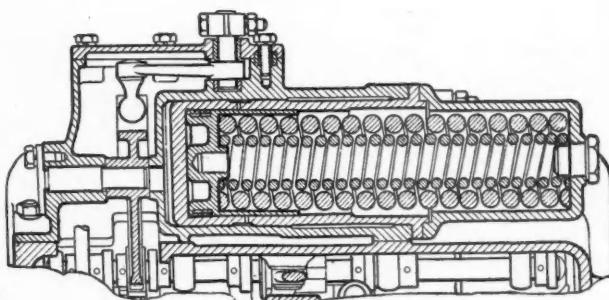
Within the gearbox, and driven by a worm gear at the front end, is a compound-plunger oil pump consisting of a crankpin engaging a crosshead with a pump plunger on each side of it. As long as the gear is in use, this pump draws oil through a filter and forces it against considerable pressure into an accumulator at the side of the gearbox. This consists merely of a cylinder containing powerful springs which force a piston toward one end of its stroke. At a certain point in the stroke of the piston, small ports are uncovered and any oil entering the reservoir thereafter is allowed to pass

out through these ports into the axial hole through the main shaft of the gearbox from which the whole transmission is lubricated.

The brake drums of the transmission are in the form of grooved pulleys. Two shoes for these drums are hinged at their upper ends, while their lower, free ends are connected to two pistons in an hydraulic cylinder. When fluid under pressure is admitted to the cylinder between these two pistons, the brake shoes are applied hard to the brake drums. Admission of fluid to the cylinder is controlled by a valve, of which a sectional view is shown. The ball valve at the foot of the valve body is pressed upward against its seat by a light coiled spring. Above the valve is a hollow plunger, in the foot of which there is a second valve seat.



Illustrations from The Autocar



(On left) Vertical section through DeNormanville safety gear, showing main clutch, direct-drive clutch, and epicyclic gear trains
(On right) Sectional view showing oil-pressure accumulator and springs

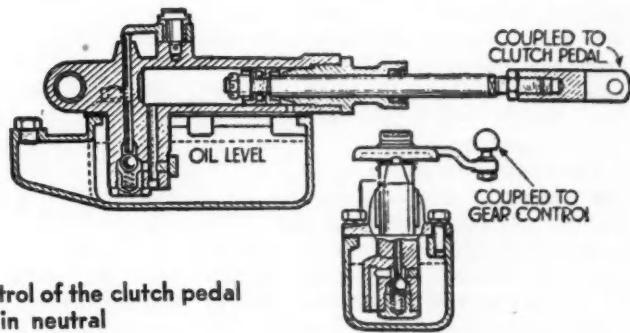
Hydraulic by Humber

When the cam is inoperative, oil under pressure enters through the inlet port and holds the valve up against its seat, so that the passage through it is closed. But when the cam is rotated it depresses a plunger and forces the valve off its seat. The oil is then free to pass through the valve and through the outlet port to the particular operating cylinder to do its work. As long as the cam remains in place, the oil can pass through the valve, but as soon as it is moved on, the oil pressure closes the valve. However, the pressure around the foot of the plunger

will hold the latter up, out of contact with the ball, until this pressure has been relieved by the escape of oil through the center of the plunger and out the exhaust ports at the top.

Accidental leakage of oil past the valve, which might be caused by a particle of dirt on the valve seat, does not interfere with the operation of the device. Control mechanisms for the reverse, first, second and third forward speeds are all alike. The oper-

ating cylinders, valves and cams are neatly arranged in a unit on one side of the cam assembly, and a single camshaft serves for all of them. This camshaft is mechanically connected to the control lever on the steering wheel. In the center of the camshaft there is a camshaft lock in the form of a sliding sleeve with recesses cut at one end, which are engaged by a spring-pressed plunger, one at a time. The (Turn to next page please)



Dashpot control of the clutch pedal in neutral

Fluid Coupling and Two-Speed Gearbox Feature New Miller Transmission

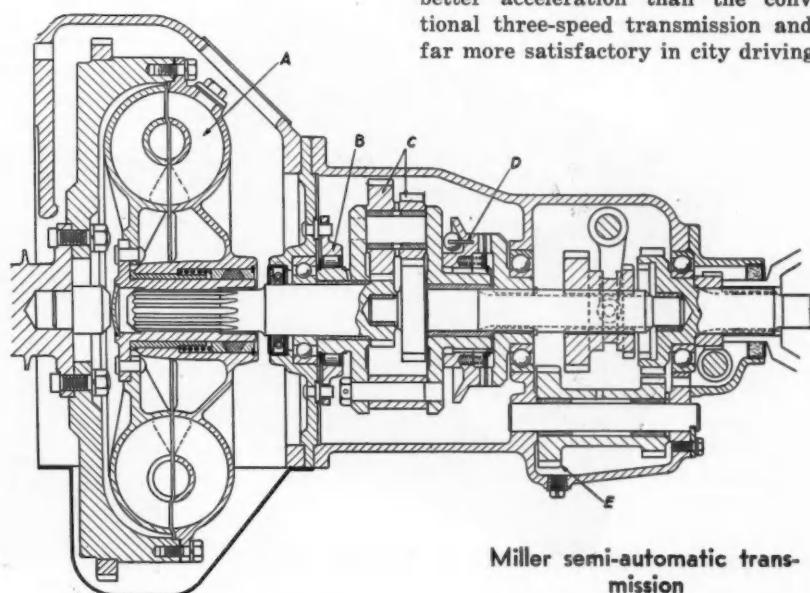
A NEW type of transmission incorporating a fluid coupling and a two-speed geared transmission has been developed by K. Miller of Beloit, Wis., and is illustrated by the sectional assembly drawing reproduced herewith. In the drawing, A is the fluid coupling; B, a free-wheeling or over-running clutch; C, a compound spur reduction gear; D, a jaw clutch engaged by centrifugal force, through a number of steel balls, and E, the reverse idler gear.

When the car is started from rest, power is transmitted through the reduction gears, the reaction on the carrier of what might be called the back gears being taken by the over-running clutch B. When such a speed has been reached that the driver wishes to change to the direct drive, he releases the accelerator pedal for a short time; the reaction due to the reduction gears then ceases and the gear carrier with the gears starts rotating in the forward direction with the speed of the propeller shaft. This energizes the steel balls, which move radially outward, thereby engaging the jaw clutch D, which puts the car in direct drive.

A certain minimum speed is required before the shift into direct drive can be made, but the driver may accelerate the car in low gear to a much higher speed if he desires. Shifting to low is accomplished in the same manner when-

ever the car speed is below the minimum at which the direct drive clutch can be engaged.

Mr. Miller states he has proved experimentally that one gear reduction of approximately 2 to 1 in combination with the flexible fluid coupling will give better acceleration than the conventional three-speed transmission and is far more satisfactory in city driving.



Miller semi-automatic transmission

sliding sleeve is connected with the clutch pedal, and before a gear change can be made the pedal must be depressed, to move the sliding sleeve to one side and thus disengage the slot from the plunger. As the camshaft is now free to rotate, the gear lever on the steering wheel can be moved to another position.

The mechanism which moves the sliding sleeve is also coupled up to a master valve, and whenever the clutch pedal is fully depressed the master valve cuts off the oil pressure from the accumulator. This allows the selector lever to be moved through intermediate gear positions without engaging one.

The high-speed or direct drive is engaged by means of a cone clutch.—*The Autocar*, March 1.

Hardening Characteristics of Carbon Tool Steel

Work in progress at the U. S. Bureau of Standards on the hardening characteristics of 1 per cent carbon tool steels has clearly demonstrated that the critical quenching rate of a steel of this type may depend not only upon the grain-size characteristics of austenite, the high-temperature constituent of steel, but also upon the initial structure, existing in the steel before it is heated for quenching and hardening. For example, identical samples of a specific steel which was not a so-called "controlled grain size" steel, were heat treated to produce microstructures which were widely different, coarsely grained

lamellar pearlite in one case, and completely sorbitic structure in the second. The pearlitic specimen when quenched in brine from 773 deg. C. (1425 deg. F.) was more brittle, hardened to a greater depth, and had a coarser grained fracture than the companion sorbitic specimen after being quenched from 815 deg. C. (1500 deg. F.).

It appears possible, therefore, to change a steel from a "deep hardening" to a "shallow hardening" steel, or vice versa, not only by suitably changing the temperature attained just prior to quenching, but also by changing the initial microstructure of the steel.

Roughness and Noise Measured in Cylinder Head Research Work

In connection with its development work on cylinder heads, much experimental work is being done in its laboratories by the Bohn Aluminum & Brass Corporation. A special technique has been developed for determining the performance of various cylinder heads. While a cylinder diagram is being traced, records are made at the same time of the roughness of the engine, and of the noise emitted by it. These three records combined give a complete picture of the performance of the particular cylinder head.

The engine is mounted in the

dynamometer frame on its regular rubber supports, which permit a certain amount of oscillation. These oscillations, of course, represent the roughness of the engine. As the test proceeds, a graph of the engine oscillations is drawn through a pantograph arrangement on a moving chart which is synchronized with the pressure indicator and the acoustimeter.

Pressure indicator cards are taken in the usual manner and in addition, the acoustimeter, which is operated through a microphone plugged directly into the cylinder head, records the

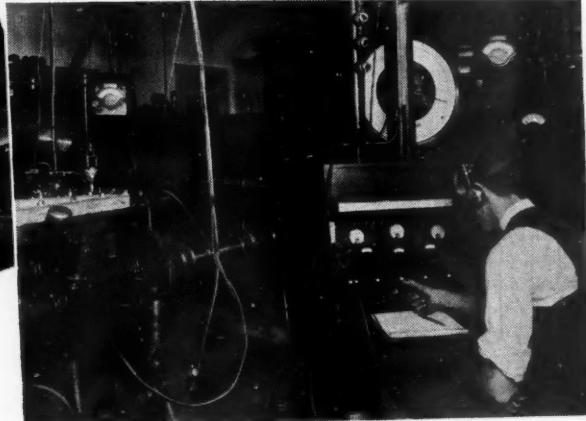
sound intensity at any time. By synchronizing the three readings for roughness, gas pressure and sound, a complete picture of the performance of the engine is provided.

A long series of runs will be made with combustion chambers of various forms and with various compression ratios. Incidentally, these tests will provide some interesting data on the effects of fuel of various octane rating and the compression pressures which can be safely used with fuel of any given octane rating with properly designed combustion chamber form.

(Left)—Measuring engine roughness at the Bohn laboratory. Arm attached to engine actuates pencil which traces graph on moving chart paper. This gives a diagram of the engine movement due to vibration caused by detonation or uneven firing



(Right)—Detonation is checked in various ways in the cylinder head research now being conducted by the Bohn laboratory. This observer is taking sound readings in decibels.



JUST AMONG OURSELVES

Net Loss on Three Quarters of Volume

PERHAPS under the conditions which existed last year, any business man who managed to keep out of the red, has no real kick coming. Nevertheless, if conditions revealed by the Pennsylvania survey, discussed elsewhere in this issue, are at all typical of the dealer situation nationally, we don't wonder that we hear so many dealers expressing concern over their profit position.

A net profit margin of 0.689 per cent on gross volume is too close for comfort, particularly where dealers are as inadequately capitalized as those who participated in this survey appear to be. The survey doesn't report on capital directly, but an inkling of what the situation is may be gathered from the fact that 84 per cent of the money these dealers had invested in new car stocks was borrowed from finance companies—and this at the end of the year when new car stocks are normally not large.

The trouble lies in the retail car departments. In 1933 and 1934 combined, the dealers reporting in the survey had total sales of new and used cars at retail of \$80,100,000, representing 73 per cent of their gross volume, and this business resulted in a net loss of \$167,000. Fortunately profits from other sources—finance reserves, wholesale, service, parts, etc.—came to the rescue so that there was a final net profit on all operations.

This does not obscure the seriousness of the fact that retail car sales accounting for nearly three-quarters of the total volume, resulted in a net loss. It is to be hoped that the information developed by the Pennsylvania survey will prove helpful in correcting this situation.

* * *

Is It a Sin To Be Big?

THE bill which Senator Wheeler introduced recently calling for discriminatory taxation of big business isn't the only evidence of a current of thinking which industry cannot safely ignore.

On the theory that there are "social and economic evils inherent in size itself," there appears to be a growing belief that bigness should be discouraged. Senator Wheeler would provide the discouragement by a graduated tax on the net income of corporations, starting with 2 per cent on \$3,000,000 and ranging up to 25 per cent on \$50,000,000 or more. Father Coughlin also favors something along this line, only he advocates more drastic taxation. President Roosevelt points to the need for protecting small business against discrimination and oppression in his message on the renewal of the NIRA. Senate Document 13, written by Gardiner C. Means, economic adviser on finance to the Secretary of Agriculture, argues that the integration of industry has

destroyed the control over prices that free markets exercised before the era of big business. Other evidences of this trend of thought might be cited, but the foregoing is enough to indicate that it has gained proportions that warrant attention.

The Wheeler bill incidentally provides an interesting commentary on the open-mindedness of the practical political economist. Under the bill's terms, the Federal Trade Commission would be authorized to investigate the relation between size and efficiency. Assuming that such an investigation by some miracle could reduce this relationship to a formula, if the formula showed that efficiency does increase with size, Senator Wheeler has the answer. Big business should be taxed for being big anyway. In that case, he holds that his bill provides a legitimate means of forcing big corporations to pass on to the public the benefits they derive from the exercise "of the privilege of being big."

The only alternative to a reduction in the size of business units that Mr. Wheeler can see is eventual state socialism. If the Senator is as wrong on this forecast as he was on his prediction that last year's silver legislation would increase China's purchasing power, socialism apparently is a long way off.

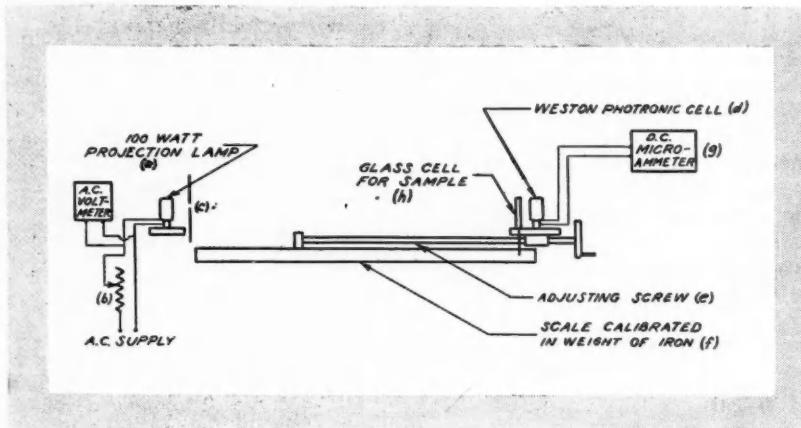
* * *

Shows

LOOKS like Atlantic City will be the site of the next Automotive Service Industries Show staged jointly by the MEMA, the NSPA and the MEWA. The date? Our guess is the first week in December. As to the New York Automobile Show, it looks like the week of Nov. 2.

The Editors

Cylinder Wear Measured of Oil as Determined by



Sketch of colorimeter used in iron analysis

AN ideal method of determining cylinder wear would be one which gives the rate of wear during the test, which requires reasonable running periods, which does not require the taking down of the engine, and which does not change the running characteristics of the engine.

There are actually three methods for determining cylinder wear in an automobile engine: The first is by weighing the parts of the engine; the second, by measuring the parts very carefully, and the third, by determining the iron contamination of the lubricating oil used in the engine.

The first and second methods are not very satisfactory because they require long running periods and engine teardowns, and they give no indication of the rate of wear during the progress of the run. With these two methods, the rate of wear obtained from a long test may be wrong, due to the fact that most of the wear may have occurred during a wearing-in period, a period of insufficient lubrication, of bad combustion, or of overload. The third method for determining cylinder wear, by the iron contamination of the lubricating oil, satisfies all of the requirements of the ideal method and has none of the disadvantages of the first and second methods.

The method of determining cylinder

wear by the iron contamination of the lubricating oil was first presented in writing in an article entitled "Cylinder Wear in Diesel Engines," by G. D. Boerlage and B. J. J. Gravesteyn, in the August, 1932, issue of *The British Motor Ship*, but prior to this practically the same method had been developed at The Pennsylvania State College from wear tests on automobile engines.¹

This new method of determining cylinder wear makes it possible to determine the rate of wear *during* the test, as well as the total wear. By this new method it is possible to tell when wear occurs at an abnormal rate, as, for instance, under starting conditions or when the lubrication conditions are poor.

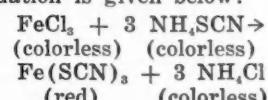
It is believed that the iron contamination of the lubricating oil is an indication of the cylinder wear, as most of the iron worn or burned away from the cylinder walls is washed back into the oil circulated in the lubricating system of the engine. There is the possibility that not all of the iron from the cylinder walls is washed back with the

¹ An extensive series of tests on a number of different lubricating oils to investigate their behavior in automobile engines under service conditions has been under way for the past two years. These tests are a co-operative project with the Pennsylvania Grade Crude Oil Association, and the results are being published in a bulletin of The Engineering Experiment Station of the Pennsylvania State College.

by George H. Keller*

oil, and recent tests made at The Pennsylvania State College show that some iron is present in the exhaust gases. If the progressive iron contamination of the lubricating oil is indicative of cylinder wear, then it is only necessary to analyze successive samples of oil for iron to obtain an excellent indication of the cylinder wear *as it occurs*. A microscopic examination of used oil shows that the iron appears in the form of abraded iron and iron oxide.

The best method found up to this time for determining the iron in a sample of the lubricating oil is by chemical analysis. The method developed by the Petroleum Research Laboratory at The Pennsylvania State College is as follows: (1) Burn about ten grams of the oil to an ash. (2) Dissolve the ash in 18 normal HC1. (3) This solution is then analyzed colorimetrically by means of the sulfocyanide method, for which the equation is given below:



The amount of iron in the sample determines the depth of the red. The more iron in the sample, the deeper the red color. This method of iron determination is satisfactory and checks the customary weight analysis. To facilitate the colorimetric analysis and to eliminate the personal equation in matching samples for depth of color, a special assembly was developed which substitutes the current generated in a photo-electric cell for the nervous reaction of the human eye.

Fig. 1 shows the arrangement of the different parts of the colorimeter. Except for the meters and scale, the entire apparatus is enclosed in a light-proof box not shown in the figure. The light source *a* consists of a 100-watt projection lamp connected across a 110-

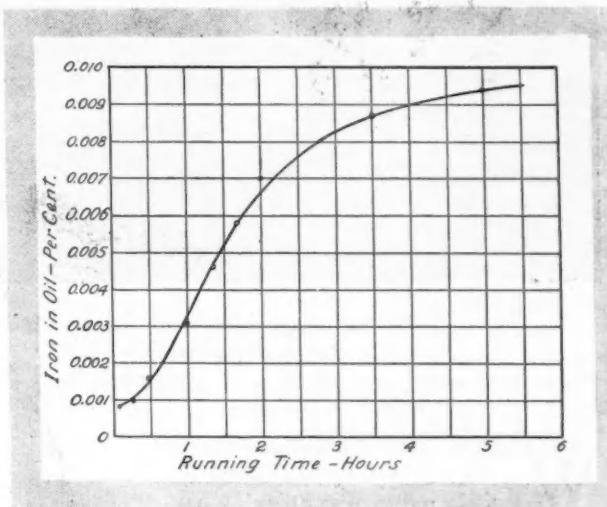
* Research Assistant, Department of Mechanical Engineering, The Pennsylvania State College.

by Iron Content the Colorimeter

volt AC supply. A rheostat *b* is connected in series with the lamp so that the voltage on the lamp can be maintained constant. Directly in front of the light source is located a $\frac{1}{2}$ -in. aperture *c* which limits the amount of light that reaches the photronic cell. The photronic cell *d* is mounted on a movable carriage so that the distance between the cell and the light source can be varied. In its extreme position the cell is about 40 in. away from the light source. The position of the carriage is changed by means of the adjusting screw *e* and the distance from the light source is indicated on the scale *f*. A DC micro-ammeter *g* is connected across the photronic cell to indicate the current flowing. The glass cell *h* containing the sample is placed on the movable carriage directly in front of the photronic cell.

The first step in using and calibrating the instrument is to place water in the sample cell with the carriage at the greatest distance from the light source. Next adjust the voltage on the light source until the micro-ammeter across the photronic cell shows a particular reading, say 15 micro-amperes. Next remove the water from the sample cell and replace it with a sample which contains a *known* percentage by weight of iron. Now move the carriage toward the light source by means of the adjusting screw until the micro-ammeter again reads 15 micro-amperes with the same voltage across the light source. By taking many known samples, it is possible to calibrate the scale to read

Accumulation of iron in crankcase oil



directly in the percentage of iron by weight in the sample.

In order to use this method for determining wear by the iron contamination of the lubricating oil, it is necessary to know the weight of oil put in the crankcase at the start, to know the weight of the oil samples drawn off for chemical analysis, to know the times the samples were taken, to know the weight of oil in the crankcase at the end of the test, and to know the total running time. From these data, together with iron analyses of the oil samples, it is possible to calculate the

iron worn from the cylinder up to the corresponding time. It is assumed that any oil lost from the engine by consumption carries with it the iron that was in that oil. If a curve is plotted with the total wear as the ordinate and the running time as the abscissa, then the slope of this curve is the rate of wear.

The curve in Fig. 2 shows the percentage of iron in the oil at any time during the test, and from this data the total wear is obtained directly while the rate of wear may be found by graphical differentiation.

Standard Gear Book

THIS book, the author tells us, was written to supply the facts behind the important advances in commercial gear production practices during the past quarter century, to reiterate the basic principles upon which the operation of the modern gear-generating machines and the art of gear designing are founded, and to show how and why transmission efficiencies of 99 per cent plus have been attained. The book seems to be intended to fill the place in gearing literature formerly occupied by

"American Machinists Gear Book," by Charles H. Logue, in the revision of which for its third edition the author of the present work cooperated, but to have planned somewhat differently to meet changed conditions.

In the first chapter tooth forms are discussed, in the second, speed and power problems, and in the third gear proportions and design, and then follow chapters devoted to the various types of gearing, such as spur, straight bevel, helical and herringbone spur

gears, etc. Materials used in machine cut gears are also fully dealt with.

The author of this work has been connected with the gear industry for a great many years and has contributed extensively to the periodical literature of the subject, which vouches for the reliability of the information given.

Standard Gear Book—Working Formulas and Tables in Gear Design, by Reginald Trautschold, M.E. Published by McGraw-Hill Book Company, Inc., New York.

Federal Designs Four-Wheel Drive Wide Range of War-Time Operating



Federal Q9 four-wheel-drive army trucks coming down the assembly line

WHAT manner of transport equipment will satisfy the needs of modern military strategy? What performance is to be expected of this transport unit?

These and many other pertinent questions are satisfied by the 2½ ton trucks recently designed by the Federal Motor Truck Co. to comply with detailed specifications furnished by the U. S. Army engineers. These specifications were arrived at after extensive experimental work, including the building of many different vehicles by the Quartermaster's Department and testing them under actual military operating conditions. At the present writing practically all of the order for 400 vehicles, complete with cabs and bodies which were also built by Federal, has been shipped.

The Federal Model Q9 is a four-wheel-drive truck, testifying to the mobility of this type of construction. It has a gross weight rating of 14,500 pounds, and is powered by a six cylinder Waukesha engine. The vehicle has a rated speed of 34 mph. on the level in high; 18 mph. over rough terrain; and a minimum speed, sustained, of 2½ mph.

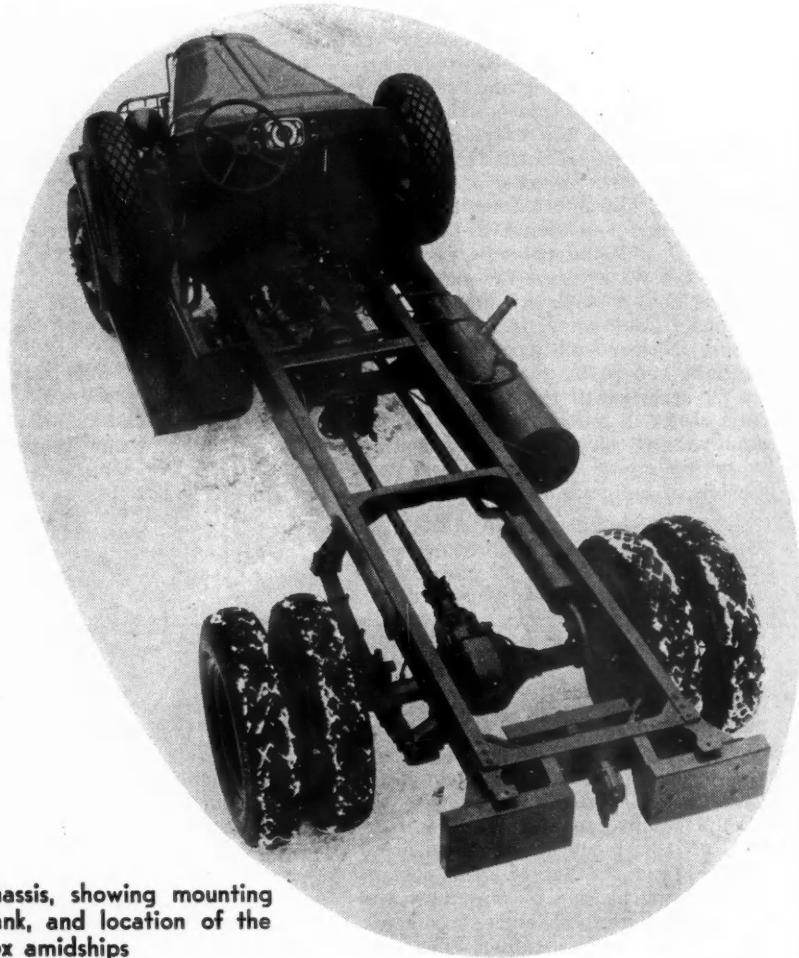
The ability of the vehicle under

specified operating conditions may be summarized as follows:

(a) It will climb a 57 per cent, dry, hard road without the use of chains when traveling on low gear in the transmission and in the transfer box. It has actually climbed this grade on second speed in the transmission, thereby proving that the grade ability in low is considerably in excess of the grade as given above.

(b) The grade ability in direct speed (both in the transmission and transfer box), with the truck loaded to 14,500 lb., is 6 per cent, approximately.

(c) Grade ability in direct speed (both in the transmission and transfer box), is 3 per cent approximately, with the truck loaded to 14,500 lb. gross and pulling a trailer load (such as a four-wheel trailer or gun carriage hav-



Perspective view of chassis, showing mounting of extra wheels, gas tank, and location of the transfer box amidships

Units to Meet Requirements

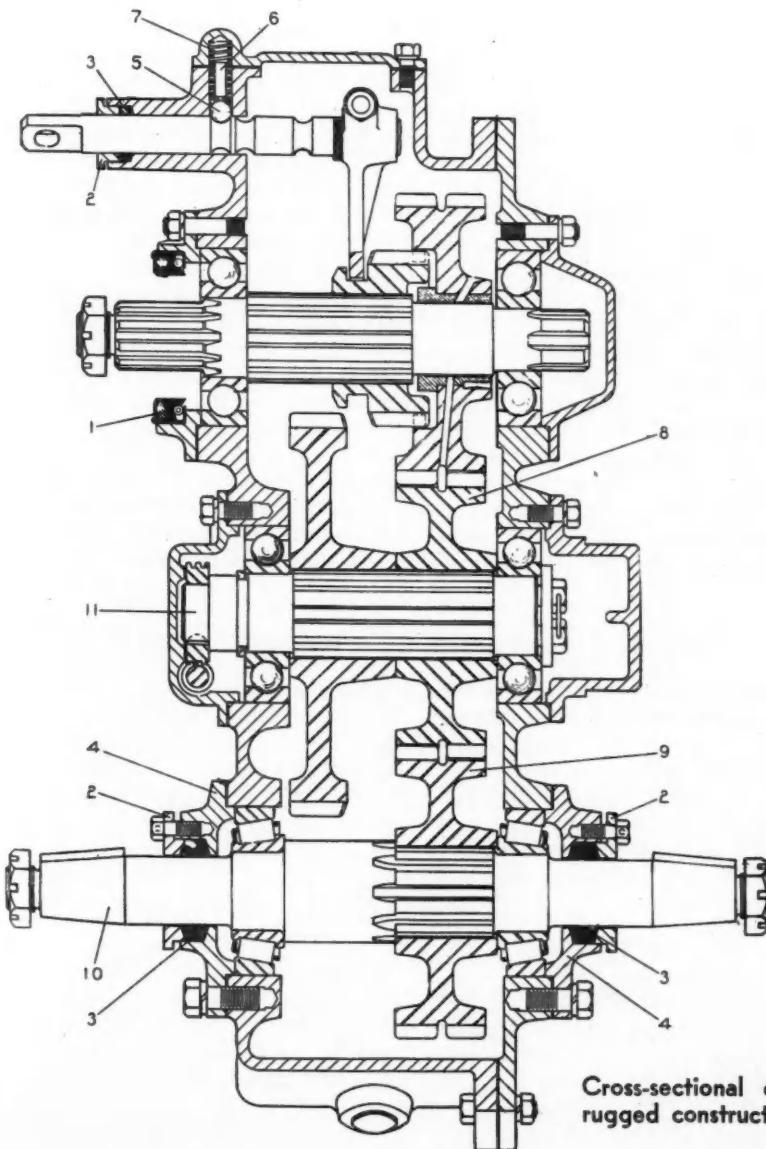
ing 8,000 lb. gross weight), the total gross weight of the truck and trailer being 22,500 lb.

(d) Gasoline consumption of the truck loaded to 14,500 lb., traveling over ordinary rolling and improved roads, approximately 6½ miles per U. S. gallon, using gasoline of 57.5 to 65 rating.

(e) Overloads: This truck is designed for military use, where the loads

Condensed Specifications of Federal Model Q9 Truck

Capacity:	2½ tons
Total gross weight:	14,500 pounds
Chassis weight:	7,800 pounds
Wheelbase:	165 inches
Motor:	Waukesha 6-cylinder, 4½ in. bore by 4¾ in. stroke.
Front Axle:	Timken double reduction
Rear Axle:	Timken double reduction
Transmission:	Brown Lipe 4-speed
Clutch:	Borg & Beck, single plate 13 in. diameter
Frame:	Heat treated pressed steel maximum depth 10 in., ¼ in. thick.
Brakes:	4-wheel hydraulic with vacuum power, 16 in. by 2¼ in. front; 16 in. x 3½ in. rear.
Electrical System:	12-volt.
Speed:	34 m.p.h. in high
Grade Ability:	57 per cent in 3rd gear on dry hard surfaced road with 14,500 lb. gross load.



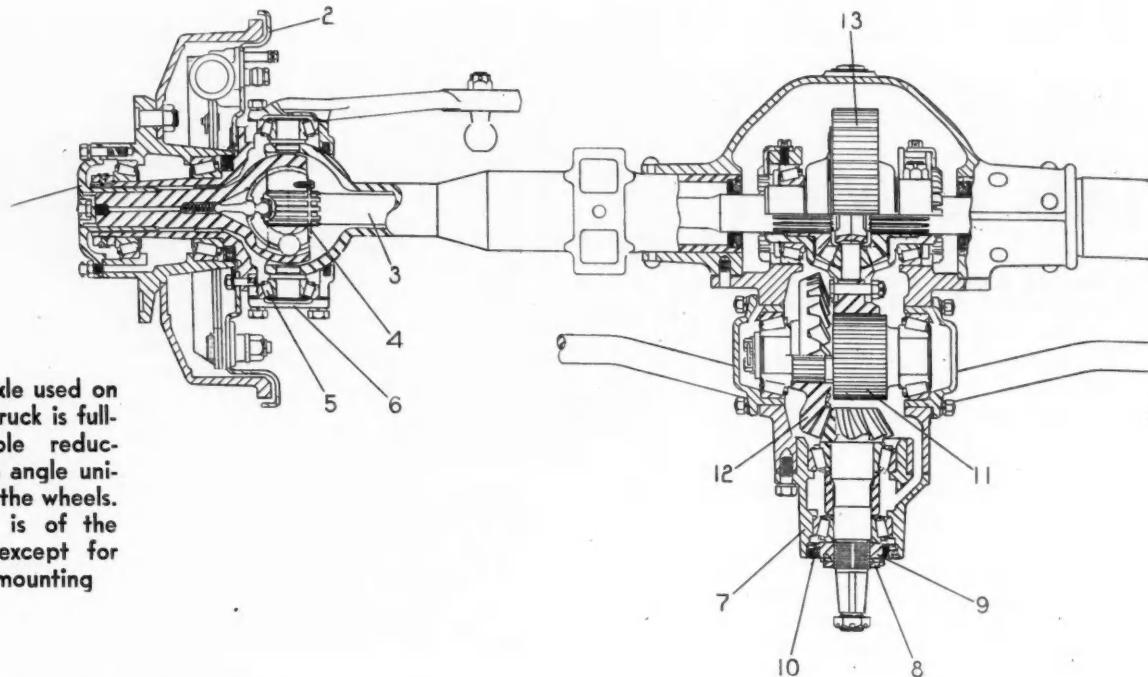
Cross-sectional drawing of transfer box showing rugged construction and simplicity of the two-shift gear set

are to be held to 14,500 lb. gross, giving an approximate 5,000 lb. pay load, including operating personnel. This truck is not to be overloaded, as is common in commercial practice.

The reasons behind the requirement of performance of this order arise from the scrapping of old ideas and the demand for a drastic improvement in army transport facilities. Up to now, two different classes of vehicles have been required to service troop movements—first, those traveling over improved or semi-improved roads to bring supplies up to the active zone, second, special equipment capable of leaving roadways and traversing usually impassable terrain to points where active troops are located.

The new vehicle is designed to satisfy both requirements, thus permitting it to carry supplies from behind the lines directly to the active zone without pause and without transfer of supplies. The chassis, therefore, serves two purposes—it has sufficient speed to operate over smooth improved roads; it has sufficient power, flotation, and tractive ability to traverse trackless spaces.

For exacting low speed work the



Timken front axle used on Federal army truck is full-floating, double reduction, with wide angle universal joints at the wheels. The rear axle is of the same design except for rigid wheel mounting

vehicle draws upon an oversized engine for the rated loads and the ability under these conditions is further enhanced by the use of a transfer box having a low gear reduction of 2.44 to 1. Large tires, 9.00 in. balloons, are used to provide flotation and prevent sinking when traversing soft terrain. As an additional aid under such conditions, an extra pair of wheels may be mounted on the front axle, by bolting to the front wheels, providing duals front and rear. This is purely an emergency measure and is not to be employed for prolonged periods.

A number of special features are embodied in the engine to meet the specifications. Because of the low grade fuel to be used, in combination with specific fuel economy requirement of 0.6 lb. per bhp. hr. at $\frac{1}{4}$ load, the engine is provided with a special head for a compression ratio of 5.8. In addition, the carburetor has been calibrated in special fashion to produce the required economy.

Something out of the ordinary for truck work is introduced with the requirement of negotiating grades up to 56 per cent. This requires a special scavenging pump arrangement in the engine to prevent alternate flooding or starving of bearings and crankcase leakage. On Waukesha engines, using the construction developed for industrial applications, they use two separate gear-type oil pumps located in the oil pan. The lower pump provides normal circulation through the engine and maintains the gage pressure. The upper pump draws the oil from the ends of the pan when operating upon heavy grades.

The general design of the chassis conforms to Federal standards, with

this difference, that certain units such as axles, transfer case, and engine details, either were designed especially for the job or are considerably oversize for the load rating. The frame is heat treated and has deeper channels than specified by the Army. Brakes are hydraulic, which is Federal practice, with a vacuum power brake attachment.

The new transfer box shown in cross-section, is of heavy duty construction and provides two speed changes—direct and a reduction of 2.44 to 1.

Full-floating axles, by Timken, are used both front and rear. Both are of conventional Timken double-reduction design, except that the front axle, as shown in cross-section, is fitted with special wide angle (30 degrees) constant velocity universal joints at the wheels to provide for front steering.

To prevent damage to the main fuel tank under conditions of severe service, the tank is mounted on the side

rail, attached at the front end by strap to the semi-circular bracket and supported by a trunnion bearing at the front end.

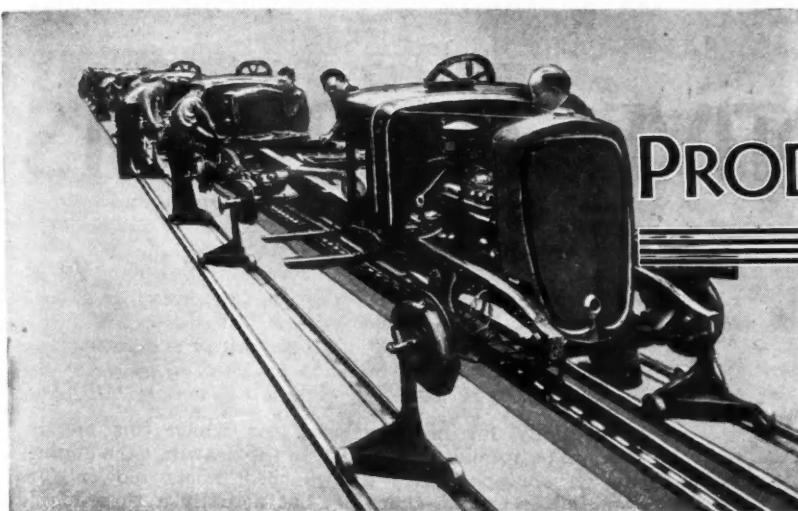
An oversized radiator core is used to provide adequate cooling under conditions imposed when the vehicle may be required to run at the low speed of 2½ mph. fully loaded, for prolonged periods. It might be noted here that the low speed requirement is based upon the need in military maneuvers of moving a convoy at marching speed.

How far the new army requirements may reflect possible commercial needs is problematic. Nevertheless, the industry and users of commercial equipment as well, may profit from a study of the performance that has been demonstrated by the vehicles designed to meet army specifications.

Stressed Parts of Nickel Alloy Steel

According to a recent study by the International Nickel Co., the following

Part	Steels Used	Part	Steels Used
Steering knuckle and steering arm,	SAE 2335, 3130, 3135, 3140	Universal joints	SAE 2315, 4615
King pin.....	SAE 2315, 2520, 3115, 4615	Rear axle drive shaft,	SAE 2340, 3140, 3250, 4340
Steering ball stud,	SAE 2315, 2520, 3115, 3125, 3140	Rear axle drive gear and pinion,	SAE 2315, 2512, 3115, 4615, 4820, X6115
Steering gear arm, SAE 2335, 3130, 3135, 3140		Rear differential gears,	SAE 2015, 2315, 3115, 4615
Steering gear and follower,	SAE 2315, 2512, 4615	Differential cross	SAE 2315, 3115, 4615
Spring clips	SAE 2335, 3135	Piston struts..32% Ni (low expansion) steel	
Shackle bolts	SAE 2315, 4615	Connecting rods	SAE 3135
Transmission gears,	SAE 2320, 2350, 2512, 3150, 3250, 3440, 4615, 4640	Connecting rod bolts,	SAE 2330, 2350, 3130, 3140
Transmission spline shaft,	SAE 2320, 2350, 2512, 3150, 3250, 4615, 4640	Piston pins	SAE 2315, 2512, 3115, 4615
Transmission countershaft,	SAE 2315, 2512, 4615, 4640	Inlet valves	SAE 3140
Free wheeling pineapple.....	SAE 4820	Exhaust valves.	{ 16 Cr, 14 Ni (.60/1.20% C) 8 Cr, 20 Ni, 1 Si, (.40% C)
Free wheeling spider.....	SAE 4615, 4820	Engine bolts and studs..	21 Cr, 12 Ni, 1 Si (.25% C)
Propeller shaft	SAE 3130, 3140	Roller bearings	SAE 4620, 4340



PRODUCTION LINES

Pioneer Alloy

The Chinese were among the pioneer metal workers. Many centuries before the Christian era they were making nickel silver by combining zinc with the nickel-copper ores found in Yunnan Province, according to *The Story of Nickel*. By 200 B. C., this alloy, which was called "paktong" or "white copper," was an article of export, being sent from China in caravans across the deserts and mountains to Bactria. Eventually it found its way to Europe, and in the early 18th century paktong was such a popular substitute for silver that the mines in Yunnan could not meet the demand, and copper-nickel ore was shipped from Litchfield County, Connecticut, to China to be made into paktong!

Special Tools

On occasion we have touched on the utility of special forming tools tipped with cemented carbides. The availability of such tools—counterbores, inverted spot-facers, multi-step cutters, etc.—has been a blessing to production men who have been on the lookout for improvement in metal cutting. A wide variety of the gamut of special tools tipped with cemented carbides will be found in a loose-leaf bulletin recently issued by the Wesson Co. Ask us for a copy.

What Is Alupak?

Alupak sheets are constructed of alternate layers of thin sheet aluminum and fine wire mesh. An elastic compound binds the various sheets together into one flexible piece, forming a gasket which, it is claimed,

will hold even on warped and superheated surfaces since the gasket actually swells when subjected to heat. This expansion forces a perfect seal on all parts of the flanged surface and fills in all warped or uneven spots. Felt Products Mfg. Co., Chicago, are the manufacturers.

Applying Science

We were told several days ago about a novel application of photoelastic analysis. Some one got the hunch that the method might be used to study the stress distribution in valves and piston rings. And apparently it worked remarkably well. As a result, the distribution of metal in the valve head was modified to an extent that eliminates all previous difficulties. A similar study on piston rings gave information of surprising nature concerning the distribution of pressures and variations in pressure around the circumference. This has been done before by different means but never so conclusively nor so directly.

Better Glass

We have it on good authority that one of the active machine tool outfits has developed a new type of production glass edging machine. It will not be ready for announcement for some months and we don't have the details at the moment. But evidently it's something worth waiting for.

Sludge Formation

Those of you who have been following the intensely interesting bulletins on lubrication from the com-

bined pens of Parish and Cammen shouldn't miss Bulletin No. 4, just issued. It deals with sludge formation and particularly the insidious action of sludge in replacing lubricant as the absorbed film on the surfaces of bearings. If you're not on the mailing list we'll try to get you on.

Packing News

Leather packing for heavy-duty industrial applications is a matter of more than passing interest to factory men, particularly the maintenance department. Some new leather closures and oil seals are described in Bulletin 701 just issued by Michigan Leather Packing. Perhaps the best feature of the bulletin is a report on some unusual tests made on one of the new packings.

Internal Grinder

Landis Tool Co. has just issued a bulletin describing applications of the Type C hydraulic internal grinder. It's a good one to add to your shop library.

For Snagging

Many of you will want a copy of *Grits and Grinds* Vol. 26, No. 1, which is devoted almost entirely to the factors involved in the selection of snagging wheels. Judge the wheel by the way it affects grinding costs. This important article tells you what things to consider.—J. G.





AUTOMOTIVE ABSTRACTS

Cappa Two-Cycle Diesel Has Two Pistons per Cylinder

THE Cappa two-stroke Diesel engine with two pistons per cylinder has been developed in Italy. So far it has been built only in two- and three-cylinder forms, but four-, six-, eight- and twelve-cylinder designs have been worked out. The three-cylinder engine, of which sectional views are shown herewith, has a bore of 3.54 in. and a stroke of 5.22 in. per piston, making the combined strokes of the two pistons in each cylinder 10.44 in. The crank radius is only 2.36 in. and the crank throw is amplified by means of the rocker arms at opposite ends of the block. This engine develops 110 hp. at 1350 r.p.m. and 115 hp. at 1500 r.p.m. Since the piston displacement is approximately 308 cu. in., the former output corresponds to a b.m.e.p. of 105 lb. per sq. in. The weight of the engine is 990 lb. or 9 lb. per hp.

The cylinder block is cast of aluminum and provided with liners of alloy cast iron. Pistons are aluminum castings. Main and connecting-rod bearings, as well as those of the rocker arms, are of the anti-friction type. The piston-pin bearings, as well as those at the ends of the rocker arms, are needle bearings.

One of the original features claimed for the engine is that the fulcrum bearings of the rocker arms at opposite ends of the cylinder block are connected by "through" bolts, which relieves the cylinder block of all forces of tension and permits of casting it of light alloy.

The two crankpins to which the pistons in a single cylinder are connected are not directly opposite each other, but spaced about 162 deg. apart. This has the effect that although the exhaust ports are uncovered before the inlet ports, the latter remain open longer than the exhaust ports.

Particular stress is laid on the compactness and accessibility of the engine. "Accessibility is a precious qual-

ity, especially for military uses, for which this engine appears to be specially adapted." In the drawings the engine is shown equipped with a two-lobed Roots blower for scavenging and super-charging, but actually a three-lobed blower is used. Lubrication is by the dry-sump system, which permits of operating the engine at steep angles of inclination. One roller chain and two toothed chains are used for driving the accessories.—*L'Auto D'Italia*, January.

Liquid Nitrogen Used in Making Shrink Fits

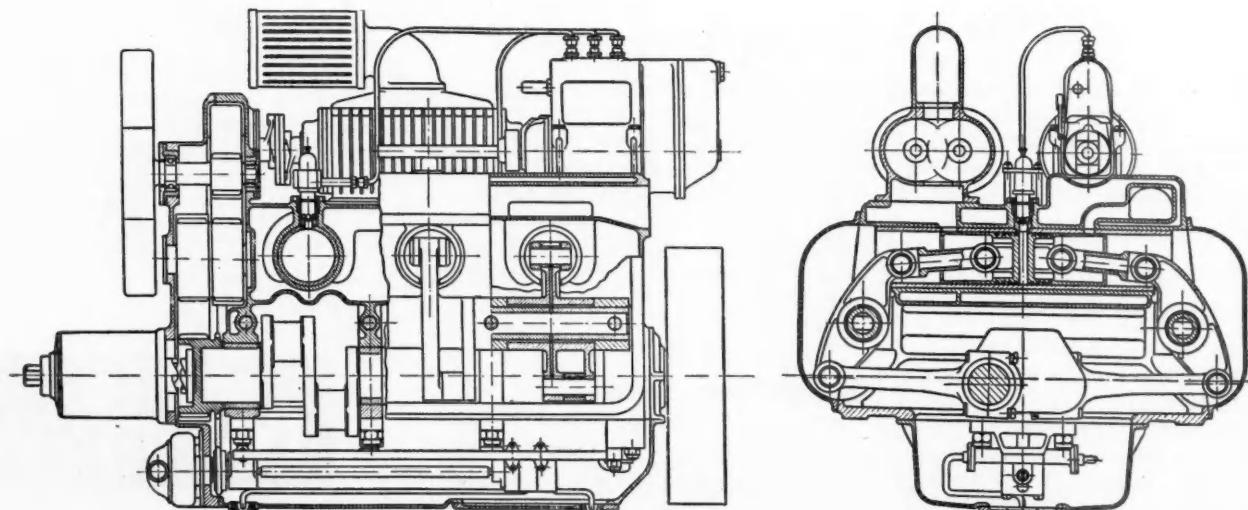
LIQUID nitrogen is used by some French concerns for making shrink fits of engine parts. At atmospheric pressure it has a temperature of minus 320 deg. F., and it is used in double-walled containers.

When a metal piece to be shrunk is submerged in the liquid, a violent ebullition takes place, due to the large temperature difference. When the ebullition ceases the piece is at substantially the same temperature as the liquid, and the shrink fit should be made at that moment.

The amount of liquid which evaporates in cooling the metal piece depends solely on the weight of the piece, the form of the latter having an effect only on the time required to cool it.

The Paris General Omnibus Company inserts cylinder liners by this method on a large scale and uses one quart of liquid nitrogen per block of six cylinders. Another use of the method is in fitting aluminum cylinder heads to air-cooled steel cylinders. There is a shrunk threaded fit between the cylinder and head. The cylinder bore is 4.45 in. and the diameter of the thread, 4.96 in. The cylinder head contains two valve seats and three spark-plug inserts screwed in place, all with a shrink fit.

Before adopting the method of cooling by liquid nitrogen,



AUTOMOTIVE ABSTRACTS

the cylinder heads were applied in the following manner: The interference required for the shrink fit being theoretically 0.012 in., the head was heated in a bath of regulus at 750 deg. F. The cylinder was then screwed into the cylinder head mechanically, cooling taking place too rapidly to make it possible to do the job by hand (twenty-four turns being required). At the end of the operation there was a shock, due to the inertia of the machine, which sometimes resulted in cracking of the head. Tests proved that the final interference was only 0.008 in., as permanent deformations took place in the cylinder head at the high temperature to which it was subjected.

Since cooling the cylinder in liquid nitrogen does not produce a shrinkage of 0.008 in., the cylinder head is heated to 350 deg. F. in a gas furnace, at which temperature its mechanical properties are not impaired. In order to immerse the cylinder in the liquid-nitrogen container, a mounting is employed which permits of having a supply of liquid on the inside of the cylinder while it is being screwed home, the operation taking a considerable time. Owing to this reserve of liquid on the inside of the cylinder it is no longer necessary to screw it home so rapidly, and in this way the dangers of the shock at the end of the operation are eliminated.

The valve seats and spark-plug inserts are shrunk in place in the cylinder head, and for this operation another type of mounting is used. The interference here is 0.004 in. The consumption of liquid nitrogen for the six operations (cylinder, two valve seats and three spark-plug inserts) is three quarts, and the total time required nine minutes.—*La Technique Automobile et Aerienne*, No. 165.

Variable Capacity Condensers Used to Measure Pressure Changes in New Indicator

HE indicator illustrated herewith is based on the principle of the ultra-micrometer developed by Reisch (described in *Jahrbuch der Drahtlosen Telegraphie und Telephonie*, 1931, p. 101). The symmetrical three-plate condenser I (Fig. 1) divides the high-frequency voltage furnished by generator G through transformer T and applies it to a Wheatstone bridge composed of two triode tubes and two ohmic resistances, in the galvanometer circuit of which a measuring loop is included. When the grounded central plate of the condenser is displaced from its position of rest the voltage is divided in a practically linear relation to the movement of this plate relative to the fixed outer plates, provided the capacities in parallel with the con-

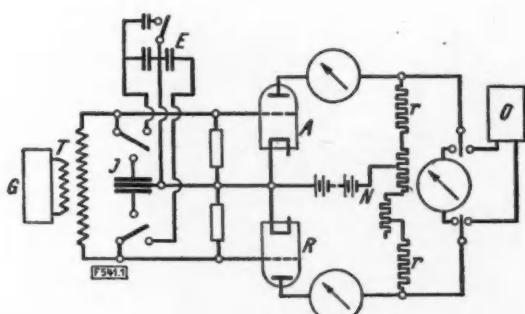


Fig. 1

denser which do not participate to an appreciable degree in the measuring movement, such as those of the plate mounting and the leads, are small in proportion to the measuring capacity and the measuring movement is small in proportion to the air gaps. This requires absolutely parallel movement, planeness and close adjustment of the central plate, and rigid mounting of the outer plates, with small harmful capacities. In order to obtain a high degree of sensitivity and a high natural frequency, it is necessary to use small air gaps (0.004-0.006 in.) and small moving masses.

Fig. 2 illustrates the general design of the indicator. Water circulation keeps the instrument quite cool even when operated continuously and without a means for shutting off communication between engine cylinder and pressure chamber. Centrally arranged small mica plates prevent short circuits in the event of excessive pressures. The pad-shaped pressure membrane can be made relatively heavy, an investigation having shown that the calibration error due to its molecular hysteresis is dependent mainly on the deflection, which is kept exceedingly small. After being once adjusted the instrument did not require resetting even though it was taken apart repeatedly. Its movable mass weighs about one-third of an ounce, the limiting deflection is 0.0004 in., and the natural frequency varies between 2000 and 10,000 cycles per second, depending on the measuring range. This would indicate that the instrument is applicable to the highest-speed engines now being built.

Owing to the linear character of the calibration curve it is possible to check the calibration by purely electrical means, a few seconds after a diagram has been taken, by merely switching over to the calibration device E , Fig. 1. This is an advantage possessed by this instrument over other known capacity-type indicators. The maximum error was held within ± 2 per cent of the measuring range.

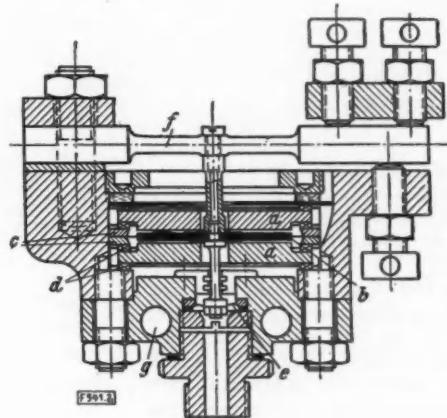


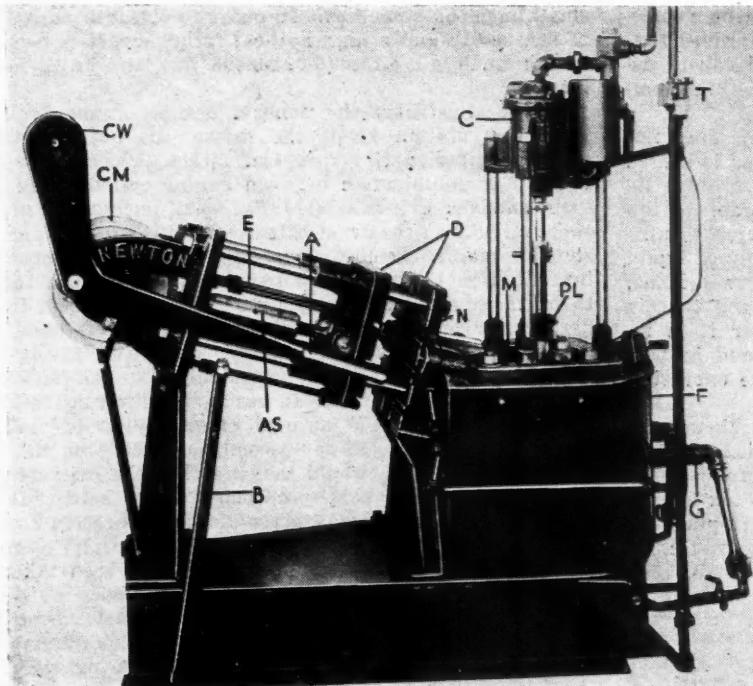
Fig. 2

Pressure variations are recorded by means of an oscillograph, whose recording strip has a velocity of 3 to 6 ft. per sec., while a time scale is inscribed on the strip by means of a tuning fork having a frequency of 100 cycles per sec. Dead-center positions are marked on the records by means of helium tubes. When taking diagrams from spark-ignition engines the spark is automatically recorded by means of an auxiliary gap in the spark circuit.

This pressure indicator was developed in the internal-combustion-engine laboratories of Vienna Technical College and has been repeatedly applied practically in the Austrian motor industry.—From a thesis presented to Vienna Technical College by Carl Wilfred Fieber.

NEW DEVELOPMENTS

Automotive Parts, Accessories and Production Tools



Newton-New Haven Die Casting Machines

Newton-New Haven Company, New Haven, Conn., have recently introduced the No. 500 four bar machine which is a heavy duty plunger type machine for the pressure casting of zinc and zinc base alloys.

With the four bar type there is far greater die capacity than on the former machines. Of the four sliding bars one is now removable to facilitate quick mounting of dies with automatic core pulls. Roller bearings have been included in the cam itself and both cam shaft bearings. A fifth bumper bar has been added at the bottom of the sliding bolster to facilitate ejection in overhanging dies. Safety device has been incorporated to prevent operator from starting the pump until die is locked tight.

Machine is equipped with automatic temperature control of metal insuring proper casting temperature at all times.

The operator moves levers A and B during each casting operation. Other operations are automatic. The metal is melted in pot M by atmospheric gas burners G under thermostatic control T. Self-aligning dies are clamped to

die bolsters D with T slots. Dies are closed and opened by lever A which turns cam CM. Casting operation is made by moving lever B to the left to operate the piston of air cylinder C. This piston drives plunger PL down and forces the metal into the dies through nozzle N. Castings are automatically ejected in the opening of the die when die ejector plate contacts adjustable bumper bars E.

Specifications: Length 8 ft. 6 in.; width, 3 ft. 7 in.; height, 5 ft. 9 in.;

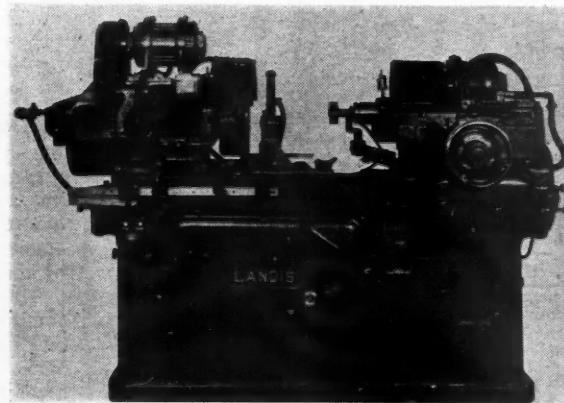
weight, 2400 lb.; die capacity, 9 x 12 in. x 9 in. thick; furnace capacity, 200 lb. of metal; casting rate, 5 to 10 shots per minute.

Landis Hydraulic Internal Grinders

The Landis Type C hydraulic internal grinders recently developed by Landis Tool Co., Waynesboro, Pa., represents the entrance of this company into the production internal grinder field. Two sizes are offered. The 15 in. x 8 in. size is recommended for the grinding of smaller bores and has as its outstanding features the Landis-Solex Sizing Device and a hydraulically reciprocating grinding wheel fixture. The 15 in. x 11 in. size is for the deeper bores. The former may be furnished as a plain machine, that is, without automatic sizing or hydraulically reciprocated grinding wheel fixture, when rapid production grinding does not have to be performed. The latter is supplied with these two high production features only on special order.

The Landis-Solex Sizing Device is responsible for the close consistent accuracy of the machine. It functions during the entire grinding cycle directly from the work diameter. As a consequence, such variables as wheel wear, difference in amount of stock to be removed and spring in the grinding wheel quill do not affect its accuracy. It may be used for any straight or tapered hole, whether blind or not. With equal efficiency it will size many splined, key-wayed or interrupted holes. Operation of the device is based on the sensitiveness of change in air pressure. This sensitiveness is made to control machine movements by means of mercury type electric switch and solenoids.

When grinding bores 2 1/2 in. in depth, or less (and most bores ground on a high production basis fall within this range), the grinding wheel fixture is hydraulically reciprocated. Bores having a depth greater than 2 1/2 in. are ground by hydraulically reciprocating the work table. Another feature is the

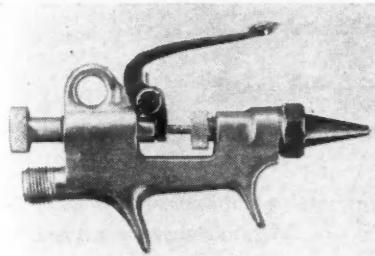


grinding wheel quill spring compensating device. As a result of its use the cross feed automatically compensates for any spring in the grinding wheel quill, thereby effecting wheel economies. Bores having steep tapers with angles up to 90 deg. may be handled on the standard machine.

Net weight of the 15 in. x 8 in. machine without electrical equipment is 5500 lb. Net weight of the 15 in. x 11 in. machine without electrical equipment is 5800 lb. Three electric motors are used. The work drive motor is a $\frac{1}{4}$ hp. constant speed on the 15 in. x 8 in. size and a 1 hp. constant speed on the 15 in. x 11 in. size. Both machines have a $1\frac{1}{2}$ hp. constant speed pump drive motor. Either a 3 or 5 hp. constant speed wheel drive motor is used on the smaller machine while the larger machine requires a 5 hp. constant speed motor.

DeVilbiss Striping Gun

In response to the demand for a gun or nozzle to flow stripes or ribbons, the DeVilbiss Company, Toledo, Ohio, has developed a Flow Gun especially for jobs such as striping automobile bumpers, and flowing sealing compounds, cements, and other plastic materials.



The gun forces the material out of the nozzle directly onto the work. Since each nozzle must be designed for a particular job, it must be built according to the specifications of the user. The gun may be made with either single or multiple nozzles which will flow any width of stripe up to one inch, and multiple nozzles may be designed to flow parallel stripes of either equal or unequal widths.

New Frapol Cutting Oils

To meet modern metal cutting conditions, a new series of straight cutting oils combining refrigeration or cooling with high film strength has been placed on the market by E. F. Houghton & Co., Philadelphia, Pa. These oils have been produced specifically to provide the high performance and low unit cost consistent with the cutting of present-day materials at high productive rates.

The basis for this series of cutting oils is the super refrigerant base which is a sulfurized product treated also to produce E-P characteristics. This base may be used, as such, by those who prefer to mix the cutting oil in their

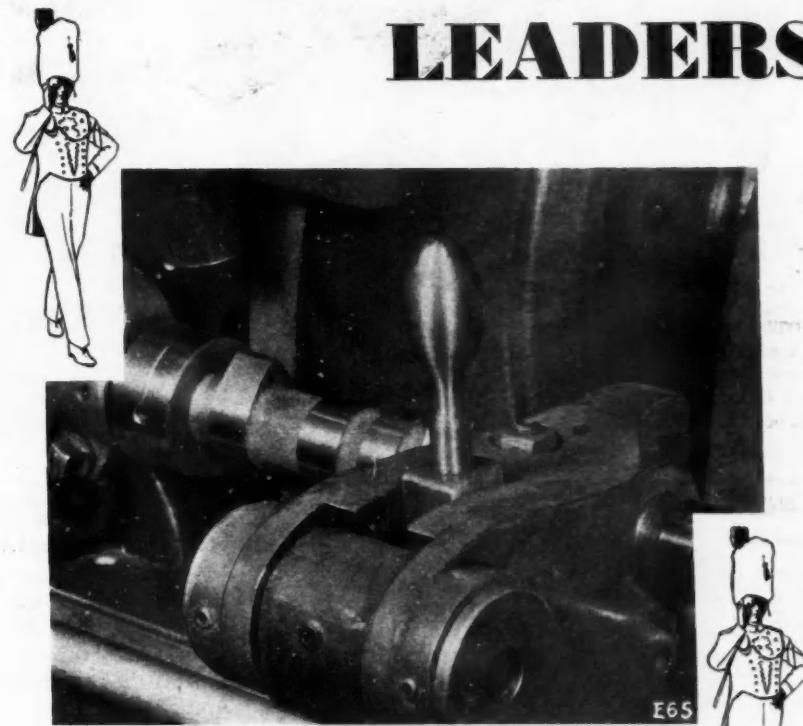
own plant. For general use where a straight cutting oil of definite strength is desired, Houghton has prepared two oils—Frapol 414 which is a mixture of the base and four parts of mineral oil; and Frapol 418 which is a mixture of the base and eight parts of mineral oil.

The conclusion is reached by this company that modern cutting oil must have a high degree of heat absorption properties and further must provide an enduring film of oil on the tool, thus substituting fluid friction for plastic friction, which in turn reduces the amount of heat generated. The company points out that cutting oil must be fluid so that it will penetrate quickly,

back of the cutting edge of the tool, which progresses at high speed. It further maintains that this cutting oil must have a high film strength to withstand extreme pressures exerted on the tool.

The new oils are said to have chemical and physical stability to a great degree making it possible to use the material over long periods of time without any change in its properties. It is claimed that the oils will withstand full load on the Almen and Timken testing machines without failure, thus demonstrating the extreme pressure characteristics that are considered to be essential in cutting fluids of this type.

Used by the LEADERS



LEADERS in industry are leaders largely because the equipment and processes they use are the best obtainable. Landis 5" Semi-Automatic Hydraulic Cam Grinders are used by the leaders in the automotive industry. The efficiency of these machines is recognized not only in this country but wherever there is need of grinders of this kind. Repeat orders are proof of entire and lasting satisfaction.

Being Semi-Automatic in operation the Landis Hydraulic Cam Grinder requires little attention on the part of the operator. One man ordinarily operates two or three machines. If you manufacture camshafts you may safely rely upon the judgment of the recognized leaders in the industry. Doing this will point you in the direction of Landis Cam Grinders—and better cams.

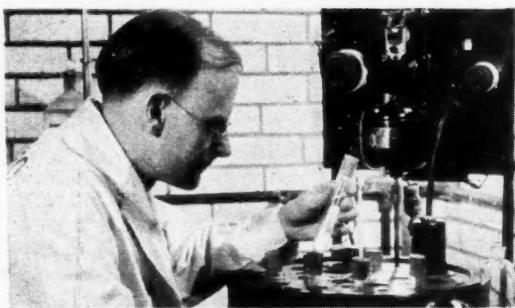
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LANDIS TOOL CO.
WAYNESBORO, PA.

ANOTHER MOBIL OIL MAKES



MOTORISTS all over the country who used Mobil oil Arctic in their cars last Winter are already asking for the new Summer Mobil oil made by the Clearosol Process. They want this new Summer oil that resists gumming, thinning and consumption. Watch Mobil oil dealers' profits soar!



NOTE THESE SPECIAL FEATURES OF THIS NEW SUMMER MOBIL OIL

RESISTS CONSUMPTION 98%... Mobil oil tests showed 98% resistance to consumption as compared with 88% for another of America's high-grade, large-selling oils. This 10% difference alone will make new customers!

RESISTS GUMMING 100%... In another test, Mobil oil scored 100%, with the other oil 32% behind! In other words, no gumming from Mobil oil...no clogged rings or stuck valves.

RESISTS THINNING 100 plus... In the third important test, measuring resistance to thinning, this new kind of Mobil oil showed 100 plus...the competitive oil only 38. Another important sales point!

THAT'S THE STORY you'll have for your customers this Summer—if you have the new Mobil oil to offer them!

This month . . . Socony-Vacuum tells over twenty million motorists from Coast to Coast about the new summer Mobil oil—now made by the famous Clearosol Process.

THIS MONTH . . . Socony-Vacuum makes its second great announcement within less than a year!

It tells America's motorists that *all* Summer Mobil oils are now made by the same Clearosol Process that produced Mobil oil Arctic last Winter.

This is great news for present Mobil oil dealers. And it makes the Socony-Vacuum dealership more valuable than ever before to new dealers!

For the new Mobil oil Arctic was an immediate success.

Won 3,000,000 Motorists

It won three million motorists in six short months—the fastest motor oil success in the history of America!

Dealers all over the nation who sold it have reported Mobil oil

sales increases of 20% to 60%!

Mobil oil dealers everywhere are now preparing for a repetition of this amazing success.

They know the three million motorists won by the Clearosol Process last Winter will want the new Summer Mobil oil made by the same famous process. They know there are millions more who have heard about it by word of mouth.

Ask for the Facts!

Now's the time to find out about the profit-making opportunities offered by the Socony-Vacuum dealership.

Spring is just around the corner. Motorists will soon be changing to Summer oil—to the new Summer Mobil oil made by Socony-Vacuum's Clearosol Process. Get your share of this business!

SOCONY- INCOR

Automotive Industries